

COAL AGE

Vol. 3

NEW YORK, MARCH 1, 1913

No. 9

ALL the nations that have died have perished through privilege. Never before have men grasped such powerful levers against the snags of special benefit as at present. There is no parallel in history for the deep hatred of injustice that exists in human hearts today.

Recall the golden age of Pericles. Greece leads civilization; Athens is pre-eminent, mistress of the world. In no other nation had the gods raised philosophy, morals and physical courage to such heights. Men said: Does not intellect govern the earth? How can Greek supremacy fail? Other civilizations have faded and gone out, but with such a constellation of genius how can Greek progress falter?

Yet it did. An aristocracy held as private property the soil and all the avenues of production. The community was divided into mutually hating classes—those who possessed special privileges and those who toiled in poverty. The inevitable happened. Greece fell from her exalted independent station in the world, and now, through the perspective of time, we can see how impossible it was for this proud people to continue their glory.

From a similar cause came the downfall of imperial Rome. Of 450,000 citizens, only 2000 possessed anything of real value. Eleven Italians owned the Province of Africa. The French Revolution resulted from a like condition, where only one per cent. of the nation's population constituted the privileged class.

The lesson is plain: We people of the United States have become a world power. Individuals here have built up greater fortunes than were ever dreamed of in ages past. A privileged class has come with our rapid development. And, in opposition to these more fortunate citizens, we have our discontented masses who live in semi-poverty. In many places, industrial slavery exists; class hates class; discord and bitterness prevail.

Many employers today are of the newer school. They have seen the handwriting on the wall and want to do what is fair by their men, but the latter have been fooled so often they are suspicious of every move. Humane motives are questioned. Distrust is every-

where evident. Labor has discovered its power and is determined to force a state where we shall associate in a condition of greater equality.

Some employers are pulling for shore. A greater number are sitting tight, drifting they know not where. A few of the more charitable and more intelligent ones, however, are trying to steer the social craft, realizing that the success of their mining operations is dependent on something more than ideal physical conditions and modern mechanical equipment at their properties. They recognize that a satisfied body of workmen—which means regular production—is just as essential as good ventilation or efficient haulage.

Whether we follow the way of Greece and Rome depends on whether special privilege is eliminated by reason or expelled by force. No man need bend his ear to the ground to hear the rumble of the approaching storm. Labor matters in the coal industry, as in most other lines of business, are unsettled. The anthracite field today is a hotbed of strife, notwithstanding the contracts recently signed. Conditions in West Virginia border on civil war.

It is a time to come out in the open and advocate a square deal all around. Half the troubles of our present mine managers are inherited from their arbitrary, all-sufficient predecessors, who invariably placed the corporation before the individual. Too many of us converse in whispers and tremble lest the truth be spoken aloud. What we need is not more education, but rather an injection of humanity mixed with equal parts courage and patriotism.

At no time on this planet has a nation made social gains that have not been lost. However, there has never been a *real* democracy before. We started right by going after the biggest culprits first, but we must not forget the corner grocer who gives short weight, the milk-dealer who sells one-third water, or the labor union that says: "I have no responsibility; a contract only binds the other fellow." An age of real permanent progress cannot come until we sweep clean from top to bottom. Might as well try to make our mines safe by eliminating big disasters only. They draw the bold headlines in the papers, but it's the little falls of roof we do **not** hear about which make our death toll so great.

A 6000 Horsepower Steam Hoist

BY FRANK H. KNEELAND

SYNOPSIS—A tandem frictional rope steam hoisting engine which hauls the output of 48 collieries up Mahanoy Plane. In the design of this machine no means were neglected to make it as reliable as possible.

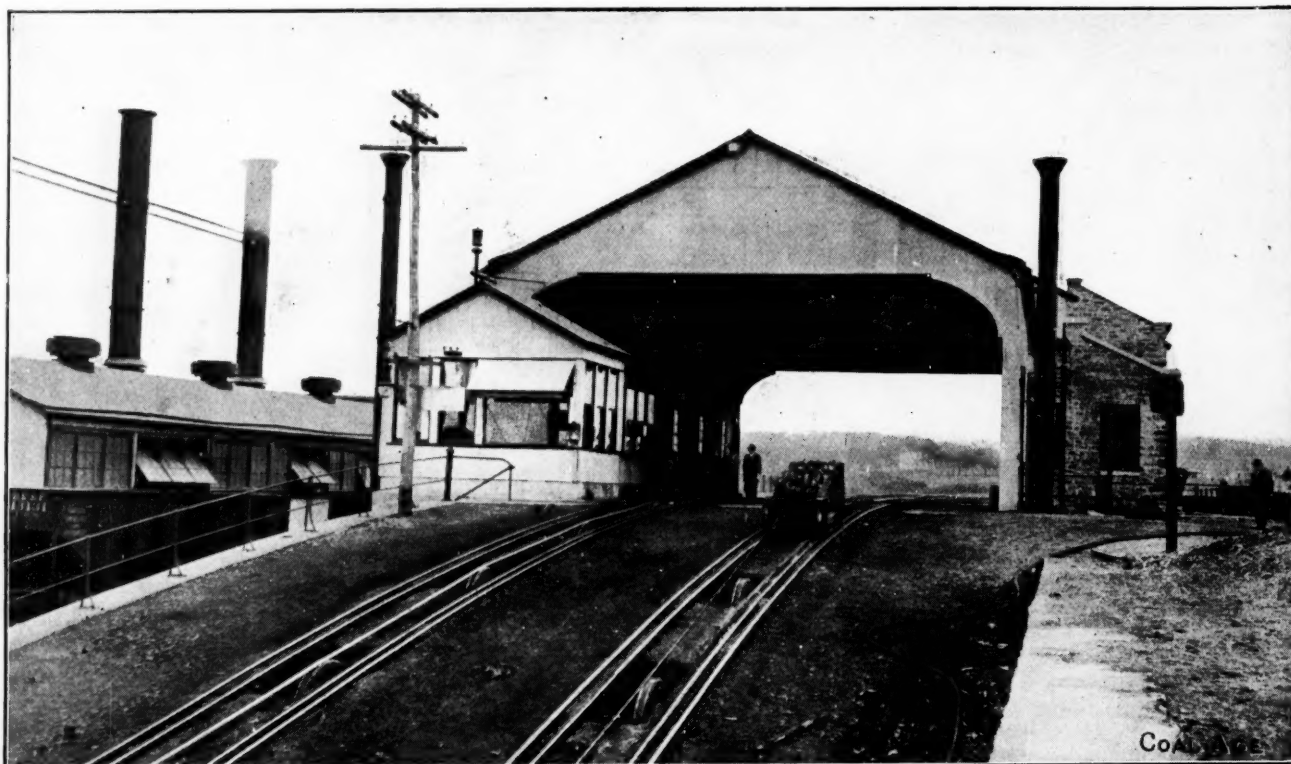
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The trend of modern steam engineering has been almost universally toward efficiency. It is only in exceptional cases when it is desired to accomplish special results, that the consumption of steam is made a secondary consideration.

THE LESSON OF PREVIOUS INSTALLATIONS

All the previous experience (extending over a period of something like 40 years) of the Reading Ry. Co. operating this plane has gone to prove that the cost of a failure of the plane engine could by no means be measured by the expense of the necessary repairs. In the design of the present machine, therefore, neither time, pains nor expense was spared to make it as reliable as possible.

The engine is designed to hoist an unbalanced load of 190 long tons, up a plane 2500 ft. long with an 18%



WEIGH HOUSE AND ENGINEER'S ROOM AT TOP OF MAHANOH PLANE

Certain uses to which the steam engine has been adapted have required the development of special forms and devices in order to accomplish the desired results wherein the consumption of steam per horsepower-hour is to all intents and purposes a negligible quantity. Perhaps the best example of this is a modern steam fire engine, which must be light, rapid and reliable in action.

Another instance of a machine wherein reliability is of much more importance than great efficiency, is to be found in hoisting engines which handle a large amount of material and are required to operate over long periods of time without shutdown or repairs.

A good example of this latter type of engine is to be found at the Mahanoy Plane, near Pottsville, Penn. An idea of the importance of reliability in this installation may be gained from the fact that the output of 48 collieries located in the Mahanoy and Shamokin valleys is here hoisted to the top of Broad Mountain, from whence it is transported to tidewater by the Philadelphia & Reading Ry. Co.

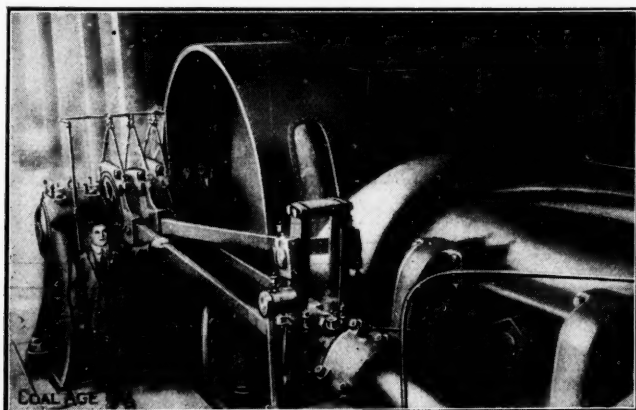
maximum grade, at a piston speed of 600 ft. per minute. Under test it has already hoisted 161 tons of unbalanced load at a piston speed of 450 ft. per minute, and a rope speed of 2250 ft. per minute, developing an indicated horsepower of 5100. At various other times 190 tons have been hoisted.

The engine was designed by John Wood, superintendent of shops and machinery of the Philadelphia & Reading Coal & Iron Co., and built jointly by the Reading Iron Co., Scott Foundry Dept. and the Pottsville Shops of the Philadelphia & Reading Coal & Iron Co. It is of the heavy rolling-mill type with piston slide valves, located on the outside of the engines. These valves are operated by the ordinary Stevenson link reversing motion from eccentrics driven by a return crank from the main crankpin of the engine.

Each of the two simple cylinders is 54 in. in diameter with a 72-in. stroke. The piston rods, which are hollow medium high carbon forged steel, are 11 in. in diameter. These pass through the pistons, forming tail rods.

10 in. in diameter, while the hole through the center is 4 in. in diameter. The crosshead or wristpins are 11 in. in diameter and $16\frac{1}{4}$ in. long, while the crankpins are 16x16 in. with a 6-in. hole through the center. These are of forged steel also.

The hollow medium high carbon forged steel crankshaft is 17 ft. 8 in. long, and is 32 in. square for a distance of 3 ft. 8 in. between the friction rollers. To a square section of this size the driving and idler drums



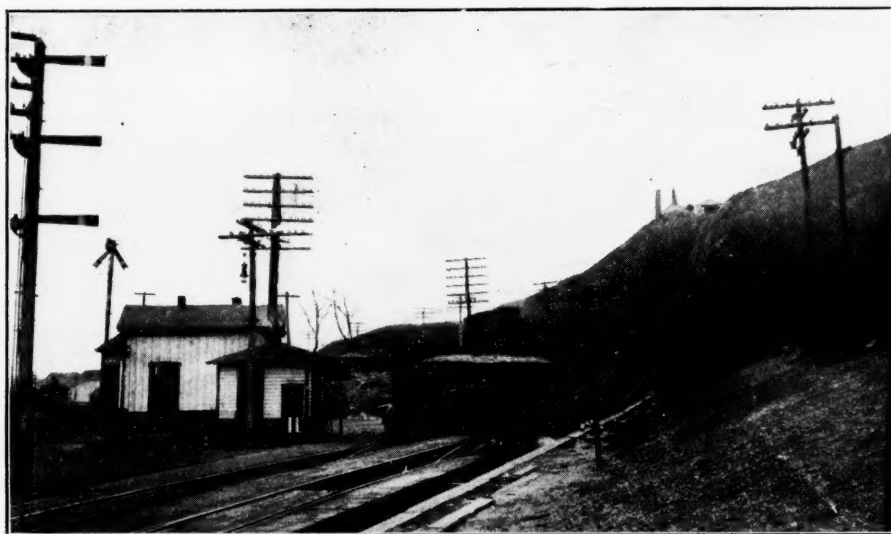
VIEW IN ENGINE ROOM. NOTE COMPARATIVE SIZE OF MAN

ers on the main shafts. This system of rollers can be adjusted to relieve the pressure on the main journals caused by the rope tending to pull the drums together.

The system of hoisting is an endless-rope friction system not dissimilar to the American type of rope transmission. There are two steel built-up rope drums, one of which only is driven by the engine, the other being simply an idler to carry the rope. The rope leads from one track of the plane and makes eight laps around both drums, then to a rendering sheave 17 ft. 2 in. diameter (which is the distance between the center lines of the two plane tracks) and thence down the plane. By this arrangement sufficient rope friction is obtained by eight half laps on the driving drum.

The driving and idler drums are 19 ft. in diameter and $29\frac{1}{2}$ and 33 in. wide respectively. The driving drum is equipped with eight and the idler drum with nine wrought-iron differential rings 18 ft. $4\frac{1}{2}$ in. in internal diameter, each grooved to receive the $2\frac{5}{8}$ -in. hoisting rope. These rings are not shrunk or fastened to the driving drum, as sufficient friction exists between the eight rings and the driving drum to hoist the load.

The main rope is $2\frac{5}{8}$ in. in diameter, made of cast steel and composed of six strands of 19 wires each, upon a wire-rope core. To each end of this large cable is fastened a barney, which travels upon a track of a lesser gage than the railroad cars.



VIEW AT BOTTOM OF PLANE, BARNEY JUST TAKING HOLD OF LOAD



VIEW DOWN PLANE FROM LANDING

are securely clamped in halves to their respective shafts. The main bearings are 26 in. in diameter and 48 in. long. A hole 11 in. in diameter runs through the entire length of this shaft.

A shaft similar to the crankshaft, except that it is 14 ft. $8\frac{1}{2}$ in. long and carries no crank, is placed 20 ft. 6 in. from the crankshaft. This carries the idler or what might be termed the auxiliary drum.

Inside of each main journal box on each of the main shafts is mounted a friction roller 10 ft. 3 in. in diameter with a 10-in. machine-finished face. This arrangement places a friction roller on each side of both drums.

Midway between the main shafts is located a roller shaft on which is mounted two friction rollers 10 ft. 3 in. in diameter whose faces meet those of the four roll-

A $1\frac{1}{2}$ -in. tail rope passing around a sheave upon a movable carriage connects the two barneys. To this tail sheave carriage is fastened another cable which passes over a back balance, keeping the rope tight at all times.

Upon reaching the bottom of the plane, the barney passes into a pit under the track, where the above mentioned movable carriage is located. The loaded cars are then run by gravity to a point in advance of this barney pit. The engine is started slowly and the barney comes in contact with and pushes against the rear bumper of the rear car, forcing the entire trip up the plane.

The hoist house is located at the head of the plane in such a position that the operator can at all times see the entire length of the incline and, therefore, has a view of the car landing. No brake is provided upon the engine,

and the only levers which the operator is required to handle are the throttle and reverse, which with a distance of 15 ft. between the usual stopping place and the head sheave provides ample means for stopping the hoist. Each cylinder of the engine is provided with a throttle 13½ in. in diameter, both being controlled by the single hand lever. The reverse is operated by a 12-in., horizontal auxiliary, steam cylinder, in conjunction with an 11-in. cataract or oil cylinder, both having an 18-in. stroke. Proper lubrication of all bearings is obtained by a continuous gravity oiling and filtering system.

THE STEAM PLANT

The steam plant consists of eight Stirling boilers, with an aggregate capacity of 2060 rated horsepower. These are fired by improved Cox automatic stokers, the improvement consisting in driving the chain grate from the rear sprocket, thus keeping the upper part of the chain always tight. A loop system of steam piping is employed, the pipe being 12 in. and 16 in. in diameter. They discharge into a steam drum 34 in. in diameter, and about 40 ft. long, which supplies the engine with steam through suitable piping. This steam drum furnishes a storage space, and reduces the pulsation of steam in the pipe connected with the boilers to a considerable extent, thus avoiding a fruitful source of priming. As an additional safeguard against the possibility of a water slug, each engine cylinder is provided with 6-in. water relief valves.

The boiler stokers above referred to burn rice coal, with an air pressure of approximately one-inch water gage, which is furnished by a suitable blast fan. Steam pressure is carried at 125 lb. The ashes are disposed of by means of a scraper line, which conveys them to a point outside of the boiler house, where they are elevated to a bin and then deposited in railroad cars for disposal.

Weight frequently expresses more than lineal dimensions. An idea of the massiveness and solidity of this hoist may be gained from the fact that the weight of the engines and drums as a whole is 500 tons, while that of the main shaft with its drum alone is approximately 90 tons.

As was stated above, the output of 48 collieries passes over this plane. This means a daily average of about 1100 cars in 12 hours. During the month of January, in 25 working days, or a total of 304 hours, 19,874 cars were hoisted.

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The Electric Mining Lamp

SPECIAL CORRESPONDENCE

The official statistics of the Prussian government show that 208 out of 344 explosions occurring between 1901 and 1911 in Prussian mines were due directly to the use or rather the abuse of the so called miners' safety lamps. It is needless to say that the Prussian government is particularly strict in its regulation of mining lamps, and in prescribing the precautions to be observed in their installation, maintenance and handling.

The lamps mostly in use—burning benzine or naphtha—can only be called safety lamps when in the hands of old, experienced miners, who are aware of their dangers and consequently know how to handle them with the necessary care. They cannot be regarded as furnishing any absolute immunity from an explosion. They have the advantage that they warn the miner of the presence

of gas and put him on his guard if he is intelligent enough to recognize the warning and careful enough to heed it when it is given.

The use of the safety lamp has been approved up to the present time, not so much because it justified its title but because it was the best lamp available. About 10 years ago, efforts were made to introduce electric mining lamps with small accumulators, but the cell rapidly deteriorated and the lamps were heavy and clumsily made. Recent lamps have overcome these difficulties, and the new electric lamps radiate a stronger and brighter light than the old benzine or naphtha lamps.

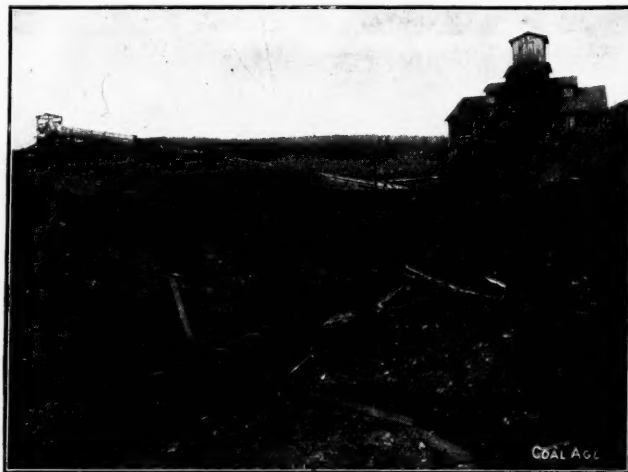
Among these the Ceag lamp deserves mention. It is made by the C. E. A. G. Co., of Dortmund, Germany, and the American rights are held by the Mannesmann Light Co. of America, with offices at 55 John St., New York City. In an international competition given by the British department of internal affairs known as the Home Office, this lamp was awarded first prize. It is the lamp exclusively used in the most dangerous mining sections in Hamm, Westphalia and also in the mines of England, France and Belgium.

The oil and benzine lamp is the right type of light to entrust to firebosses and foremen. It would be well to give it also to rib bosses but to hand it to every man, regardless of his experience is to put fellow workers of such men in unnecessary jeopardy.

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A Successful Scraper Line

The accompanying illustration shows 1500 ft. of Rivetless chain at the washery of the Susquehanna Coal Co., Nanticoke, Penn., which has been conveying from 1600 to 1700 tons of wet culm and coal per day for the past five months without any delay from breakdowns.



THE SCRAPER LINE AS IT APPEARS IN OPERATION

This conveyor consists of a double line of 9 in. pitch chain of the type known as double outside pin drive. It passes over idlers at the loading point and is propelled by sprockets at the head of the incline. It is driven by the 150-hp. motor, which also operates the washery.

This line displaced one of almost identical capacity, but which had an annoying faculty for breaking down, thus causing delays averaging about 10 per cent. of the time. As stated above, no annoyance from this cause has thus far been experienced since its installation several months ago.

A New Electrically Driven Hoist

EDITORIAL CORRESPONDENCE

SYNOPSIS—A hoist with two 10-ft. drums driven through cut steel herringbone gears by a 700-hp. alternating-current motor. Several other features are embodied in the construction of this machine that are not found in the ordinary hoist.

The concentration of power in central stations in various mining districts and its distribution by means of high voltage alternating currents has rendered it advantageous to operate hoists from these lines without making use of a rotary converter or motor-generator set. Hoists thus operated are, however, exceptional, although the ad-

is done by means of a liquid rheostat of the rising and falling weir type. The rate at which the water level may be raised, and, therefore, the rate of acceleration of the motor, can be made independent of the weir, so that automatic acceleration can be obtained, while the lowering of the weir for the retarding of the motor can be done quite rapidly. Each drum is equipped with an extra heavy band brake, one being operated by hand and the other by means of a weighted air cylinder. The weighted brake is of the floating lever type, which permits of the band being only partially applied or set up tight as may be desired. It is possible, therefore, to regulate the pres-

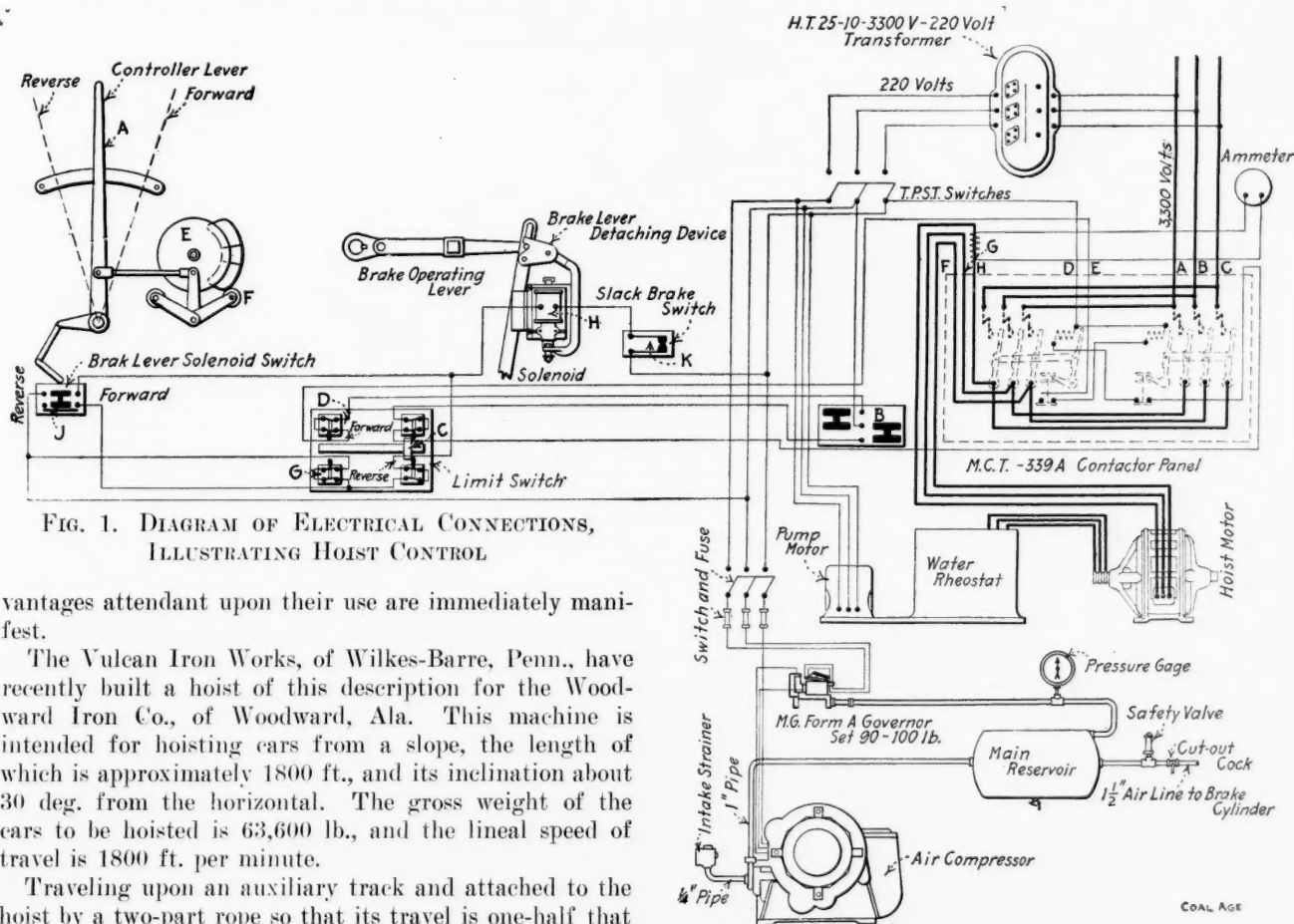


FIG. 1. DIAGRAM OF ELECTRICAL CONNECTIONS, ILLUSTRATING HOIST CONTROL

vantages attendant upon their use are immediately manifest.

The Vulcan Iron Works, of Wilkes-Barre, Penn., have recently built a hoist of this description for the Woodward Iron Co., of Woodward, Ala. This machine is intended for hoisting cars from a slope, the length of which is approximately 1800 ft., and its inclination about 30 deg. from the horizontal. The gross weight of the cars to be hoisted is 63,600 lb., and the lineal speed of travel is 1800 ft. per minute.

Traveling upon an auxiliary track and attached to the hoist by a two-part rope so that its travel is one-half that of the cars is a counterbalance weighing 45,000 lb. The hoist is provided with two drums each 10 ft. in diameter, which are grooved to coil 1800 ft. of 1 1/2-in. wire rope in two layers. The motor has a full load speed of 290 r.p.m., and the power is transmitted to the drum shaft by means of single reduction cast-steel machine-cut gears of the herringbone type.

THE MOTOR AND ITS CONTROL

The hoist is driven by a General Electric variable-speed, polar-wound rotor, 700 hp., 10-pole, 3300-volt, three-phase, 25-cycle induction motor, which is connected to the countershaft of the hoist by means of a flexible coupling of the flange and rubber-buffer variety.

The speed of the motor is varied and controlled by cutting resistance into and out of the rotor circuit. This

sure on the band, allowing the drum to revolve as slowly as may be wished.

Operating in conjunction with this drum brake, there is a smaller brake on the counter shaft, and both are applied simultaneously. This removes all undue shock or stress due to the inertia of the rapidly moving parts in case the emergency is suddenly thrown on. There is, therefore, no danger of stripping or other injury to the gears from this contingency.

GUARDING AGAINST ACCIDENTS AND OVERWINDS

The means employed to guard against accidents and overwinds upon this hoist are unique and well worthy of attention. That they may be better understood, reference should be made to Fig. 1. We will suppose that the ma-

chine is at rest preparatory to a hoist. The controller lever *A* is moved to its forward position, thus through a shaft closing the circuit in the master switch *B*, which starts the hoist. A further movement reduces the resistance in the liquid rheostat causing the hoist to accelerate in motion.

The traveling nut *C* on the limit switch has a movement corresponding to that of the load being hoisted. Near the landing point, this nut forces apart the contacts *D*, which are connected to contactors and opens them. Simultaneously the cam *E*, which is geared to the drum, has returned the controller lever *A* to its central or off position.

The hoist is now running from momentum, but at an adjustable, predetermined point the nut *C* opens up the switch *G*. This breaks the circuit to the solenoid *H*, allowing its core to fall and disconnect the brake-operat-

direction. This closes the main contactors through the controller switch *B*.

At the same time this has short-circuited the limit switch *G* through the switch *J*, thus reenergizing the solenoid *H* and raising its core again giving the engineer control of the brake which may now be released. In case the overwind is with a loaded cage, the machine would now start to reverse; if with an empty cage, the motor would be slightly energized and would sustain the load.

When the brake wears sufficiently to allow the brake weight to settle to the limit of its travel, the slack brake switch *K* will be opened and the brake cannot be released until the necessary tightening adjustments are made.

As soon as the hoist starts in motion after an overwind, or other accident calling the emergency apparatus into action, the contacts on the limit switch are automatically reset by the nut *C* during its return movement.

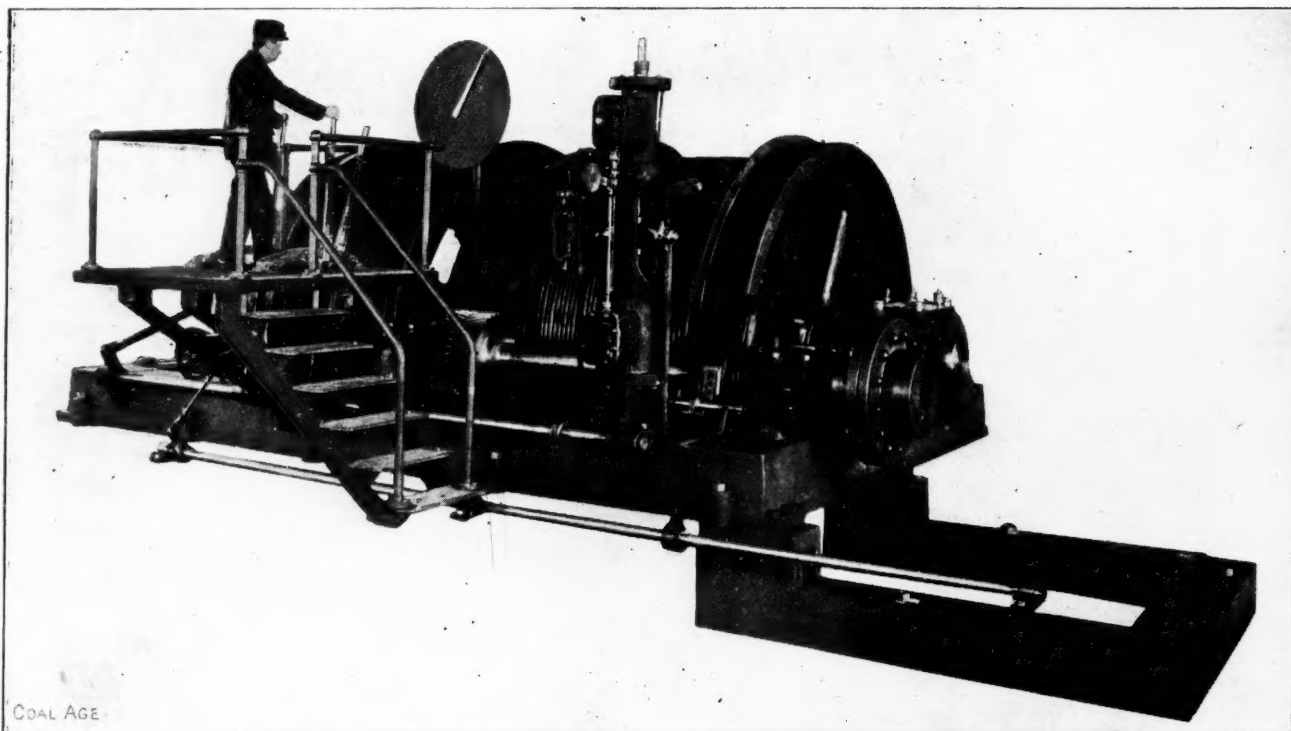


FIG. 2. THE HOIST, SHOWING BEDPLATE FOR MOTOR IN PLACE. PART OF GEAR COVER REMOVED, SHOWING HERRINGBONE PINION

ing lever from the engineer's lever. This allows the weighted valve in the cylinder controlling the brake to shut off the air supply and exhaust that which is already in the cylinder, thus allowing the weighted brake to come into action bringing the hoist to rest.

Of course, under ordinary circumstances, the operator would have shut off the current and applied the brake through the medium of the air cylinder by hand and none of the emergency devices described as operating above would have come into play. The solenoid is provided solely for case of accident or overwind.

HOW THE ENGINEER REGAINS CONTROL OF MACHINE

If an overwind has occurred and the switches *D* and *G* are both open, to again gain control of his machine, the operator moves a lever (which is the air-brake lever and is not shown), to the on position, then throws the controller lever *A* to the first contact in the reverse

Any hoist driven by an alternating-current motor cannot ordinarily be made to run too fast, even when lowering a load. The motor then tends to generate current into the line, at the same time it tends to keep in step electrically with the generators from which it draws its supply. This hoist cannot be run in either direction without current on the motor.

As stated above, the line circuit to this machine is 3300 volts. The control circuit is of 220 volts, both are 25 cycle. Air for operating the brake is provided by a General Electric 24½-cu.ft. electric driven auxiliary air compressor, while the resistance employed is a General Electric liquid rheostat.

NUMBER AND POSITION OF CONTROL LEVERS

There are in all three levers employed for the control of this machine. These are all located in a convenient quadrant on the operator's platform, which is elevated at

such a height that he may easily see over the top of the hoisting drums.

The bedplates and pedestals on this machine are both heavy in design and free from sharp angles and projections. The base for the motor is securely bolted to that of the hoist, and the whole may be set up as one unit.

Whatever other impressions may be received by the

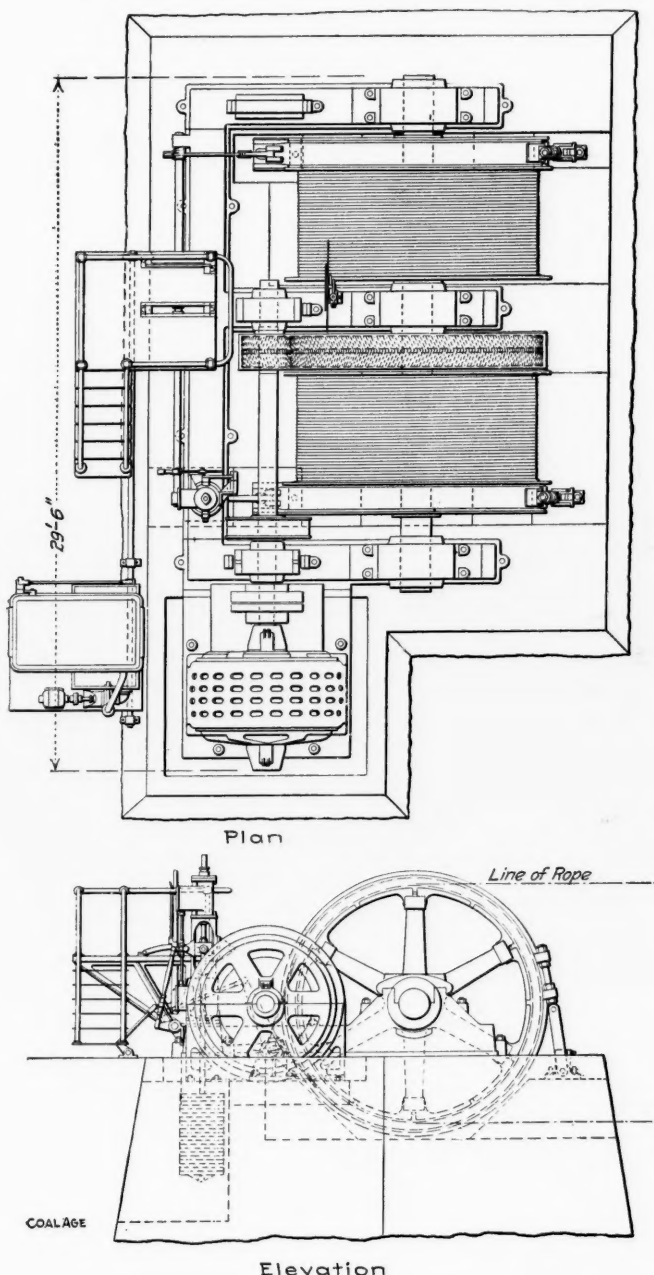


FIG. 3. PLAN AND ELEVATION OF HOIST AND MOTOR

man who sees this hoist, the idea that will first force itself upon his mind, and probably remain with him the longest, is that the machine was designed and built "for business."

The massiveness and solidity in the design, together with the obvious care and attention that have been given, even to what might be considered unimportant details, give this machine the appearance of one which should stand up indefinitely under any operating conditions to which such a hoist might legitimately be subjected.

Karl F. Schoew

A circular letter, dated Feb. 20, 1913, announces the candidacy of Karl F. Schoew, for the position of chief of the Department of Mines, in West Virginia. The present incumbent of the office, John Laing, has served the state during the past four years. Mr. Laing's term of office expires June 30, 1913. It has been known for some time by Mr. Laing's intimate friends that he does not desire and would not accept an appointment to the office for another term. During his incumbency, Mr. Laing has brought the Department to a high state of efficiency, in which work he has had the unqualified and earnest support of the twelve district mine inspectors, who constitute the present efficient mine-inspection force of West Virginia.

Karl F. Schoew, at present mine inspector for the 1st district, having served the state in that capacity for a term of four years, now desires to succeed his chief. Mr. Schoew has had a practical mining experience of 23 years, 15 of which have been devoted to mining engineering. His work during the past four years, as district mine inspector, has been performed with credit to himself and the department, and has earned for him the unqualified indorsement of all the operators in his district.

As every inspector knows, the work of mine inspection requires more than a thorough mining knowledge and experience on the part of the inspector; he must possess good judgment and tact in dealing with the numberless complicated questions that arise constantly and which are submitted to the mine inspector for his decision. The fact that harmony has prevailed in the first district speaks well for the ability of Mr. Schoew in this respect.

Mr. Schoew reports that during his term of office not a man has been burned or killed by a gas or coal explosion through carelessness. Mr. Schoew makes this statement more in a spirit of thankfulness, realizing that much of the credit for this must be ascribed to good fortune rather than that it should be regarded as the result wholly of good management and efficiency on his part.

Mr. Schoew has the success of the mining industry at heart, and thoroughly indorses the policy followed by Mr. Laing during his term of office. He believes that this policy of educating the miner, which has been followed throughout the state and which has received the hearty indorsement of both inspectors and operators, has reduced the loss of life and increased the value of mining property and contributed more to the success of the industry in the state than any other factor. It is Mr. Schoew's hope that the harmony and prosperity that has existed in the 1st district and, largely, elsewhere in the state can be further advanced by the promotion of good will and a proper use of diplomacy in the treatment of all questions that arise.

During Mr. Schoew's residence in West Virginia, he has lived both in the northern and southern portions of the state, which fact makes him thoroughly familiar with mining conditions in both these fields. If Mr. Schoew is successful in securing the appointment as chief of the Department of Mines in West Virginia, he will receive the hearty coöperation of COAL AGE, in every effort to promote education and raise the standard of mining, which is our constant aim and purpose in respect to every mining state and district.

A Large Capacity Electric Hoist

By W. H. EASTON*

SYNOPSIS—The difficulties incident to the application of electricity for hoisting purposes are too well known to require comment here. These seem to have been successfully overcome, in the case of the Coalwood hoist, where it is proposed to handle 5000 tons per day of 8 hr. from a depth of 650 ft. Reserve power for overcoming the excessive initial starting load is provided for by means of a flywheel, and perfect control is assured throughout the hoist.

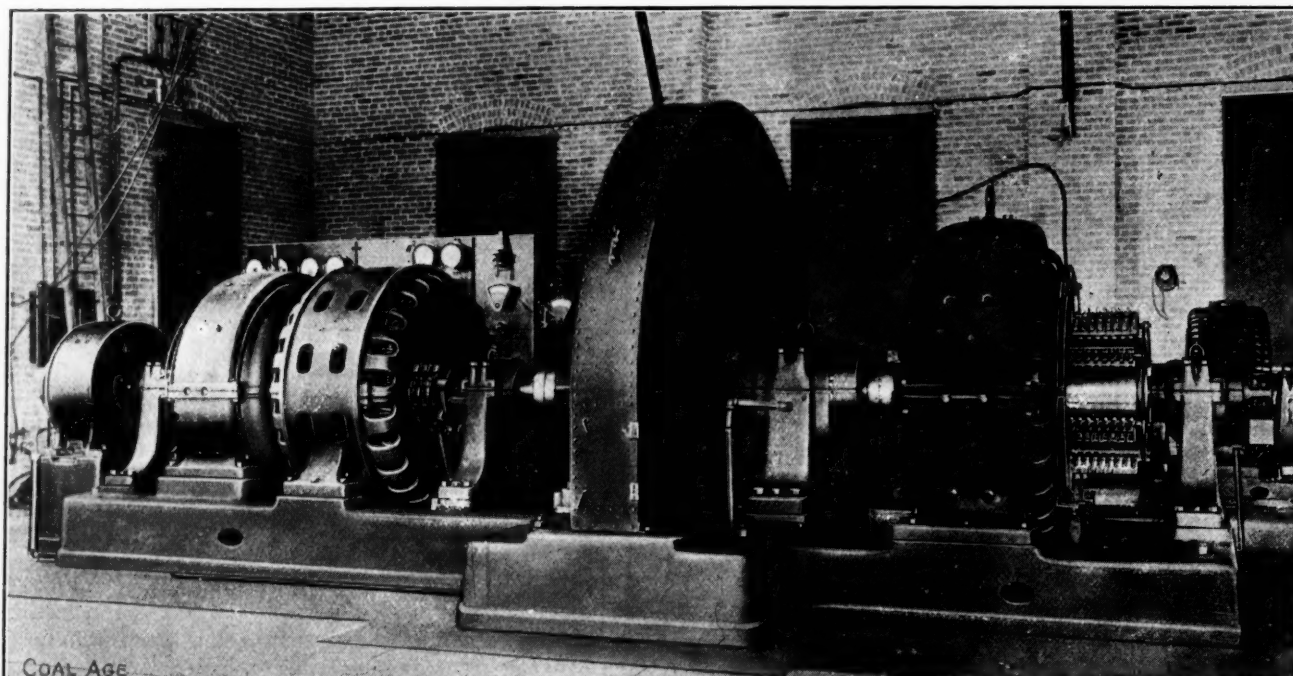
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The interesting announcement has just been made that the Virginia-Pocahontas Coal Co. has ordered from the Ottumwa Iron Works and the Westinghouse Electric &

trolled, by means of a small lever, with perfect ease and complete accuracy. The loss of energy at low speeds is small; in spite of the fact that the hoist will develop 2200 hp. on starting, at no time can more than 700 hp. be drawn from the main transmission lines. These results are unusual and the principles by which they are obtained are worthy of particular note.

DESCRIPTION OF THE COALWOOD HOIST

The Coalwood hoist will be operated by the Westinghouse Flywheel Equalizer System. In this system the current from the transmission line is not received directly by the hoist motor, but by a flywheel motor-generator set,



WESTINGHOUSE MOTOR-GENERATOR SET, WITH 25,000-LB. FLYWHEEL, FOR CLEVELAND-CLIFFS HOIST

Mfg. Co. what will be one of the largest, if not the largest, coal-mine hoists in this country for their new mine at Coalwood, W. Va. This hoist will raise 5000 tons of coal in 8 hr., from a depth of 650 ft. The hoist motor will exert a maximum horsepower of 2200 during each normal hoist.

Those familiar with small electric hoists will ask at once: How can so large a machine be controlled with the necessary ease and certainty? Will there not be a tremendous waste of energy in resistance when the motor is started at slow speed? How can the generating and transmission lines stand the heavy peaks, drawn from the line in starting?

For a hoist of this capacity, patterned after the ordinary installation, in which the hoist motor receives its power directly from the transmission line and is controlled through resistance, the points raised by these questions might prove serious obstacles. But they present none for the Coalwood installation, as it is con-

sisting of an alternating-current motor, a direct-current generator, and a heavy flywheel, all mounted on the same shaft. The hoist motor is a direct-current machine and receives its energy from the generator of the flywheel set. The illustrations herewith show the motor-generator set and the hoists of the Cleveland Cliffs Iron Co., which operate on the same principle and constitute what is at present the largest electric hoist of this type in operation in America.

The alternating-current motor, of course, drives the direct-current generator and flywheel by the energy it receives from the line. It is so arranged that, whenever there is a demand for power in excess of the average, it will *slow down* automatically, thereby permitting the flywheel to aid in driving the generator. When the heavy demand for power ceases, the motor speeds up automatically, and in doing so restores the expended energy to the flywheel. So nicely are the conditions balanced that when hoisting steadily at the rate of 5000 tons a day, with peaks of 2200 hp. at each hoist, there is not more than 700 hp. drawn from the supply line.

*Pittsburgh, Penn.

The hoist motor is controlled by adjusting the voltage of the generator by means of a field rheostat. This rheostat is small and light and wastes but little current, but by moving its lever, the hoist motor can be run at any speed from zero to maximum in either direction. Acceleration and retardation limits are provided, which, together with the ease of control, reduce the possibility of accident to the minimum, and probably below anything that has been accomplished with steam hoists.

METHOD OF MAINTAINING RESERVE POWER

This motor is of the slip-ring type and the three phases are connected to three stationary plates, in earthenware pots filled with a solution of carbonate of soda. Above

and the movable plates are raised, thus introducing resistance into the rotor circuit of the main motor, reducing its speed and bringing the flywheel into action. When the current to the main motor falls below the adjusted value, the movable electrodes fall, thereby permitting the speed of the flywheel set to increase to normal.

This system has been used in a number of installations and has proved eminently satisfactory. It overcomes many difficulties which would be unsurmountable with steam hoists or with direct-driven electric hoists and enables the mine operator to use hoists of practically unlimited size with a high degree of economy and perfect ease of control.

In the Cleveland Cliffs installation the main hoist motor has a maximum capacity of 1000 hp. It can raise a net load of 10,000 lb. from a depth of 1000 ft. at the rate of 1500 ft. a minute, and can make 40 trips an hour. When the hoist is working steadily at this rate, the alternating-current motor of the flywheel motor-generator set draws not over 365 hp. from the line and its variation in speed is about 15 per cent.

Generator Ratings

Standard ratings of Westinghouse alternating-current turbo-generators are based on two different methods of determining capacity. First, a rating with guarantees covering performance at normal loads and at certain overloads, momentary peak loads being within the guaranteed overload capacity. Second, a rating at the maximum safe operating capacity of the machine, with no guaranteed overload capacity.

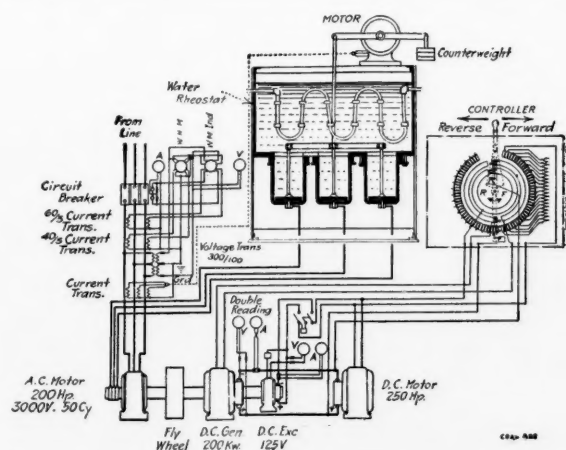
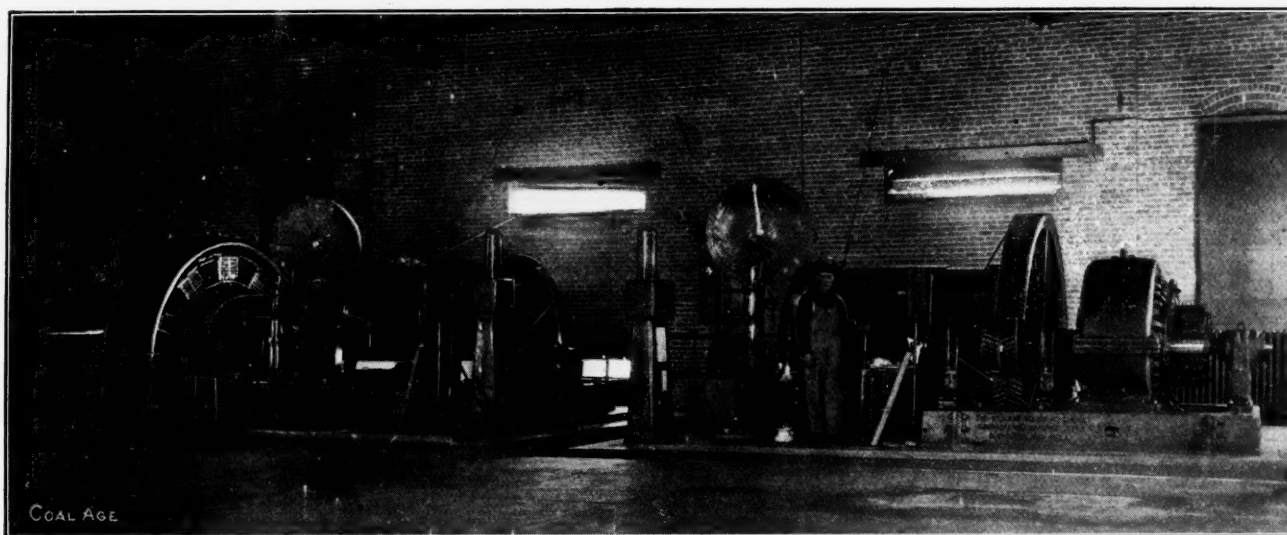


DIAGRAM OF WESTINGHOUSE FLYWHEEL EQUALIZER HOISTING SYSTEM



MAIN CLEVELAND CLIFFS HOIST OF 1000 HP. AND AUXILIARY OF 400 HP. ON THE RIGHT

these plates are movable electrodes, connected together electrically; these electrodes are nearly balanced by an adjustable counterweight and can be raised and lowered by a small motor. This latter receives its current from series transformers in the main line to the main alternating-current motor.

When, on account of an excessive demand for power by the hoist motor, the main alternating-current motor receives more current than that for which the system is adjusted, the current in the small motor also increases,

The maximum rating basis is proving to be a highly desirable one, the tendency being to install units of such capacity that as the load on the station varies, additional machines can be cut in or out, and the remaining units operated continuously at or near their maximum rating and efficiency.

It is the simplest to use in making or comparing guarantees, as well as the most satisfactory, from the central-station operator's standpoint, when once it is thoroughly understood.

A Hoisting and Haulage Plant in India

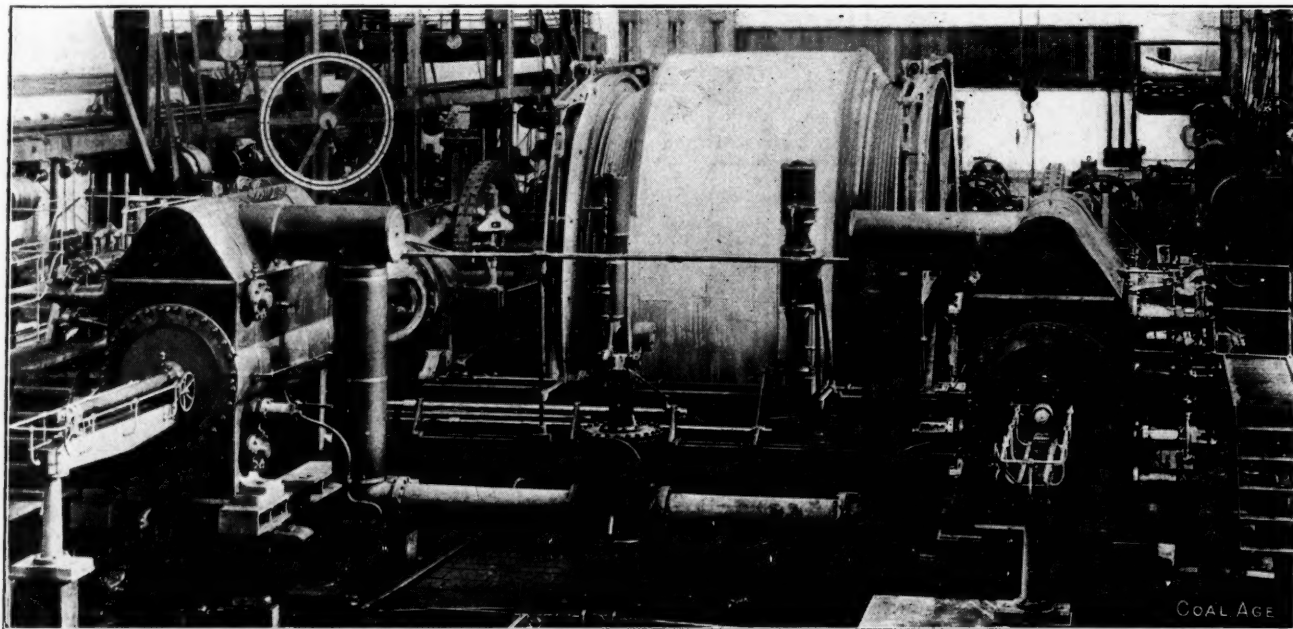
SYNOPSIS—Description of both a hoisting and haulage plant of large capacity. The hoisting engine is designed for a depth of 3700 ft. and has 42-in. cylinders and a stroke of 7 ft. It is equipped with a Gott overwinding device, which has proved particularly effective.

✱

The question of overwind prevention is now receiving considerable attention, and the particulars of a plant constructed for mines in India will be of interest. The information has been specially secured for this journal, and relates to a 5500-hp. corliss winding engine and a 100-b.hp. electric haulage gear, the former being constructed for use at a gold mine and the latter for a coal operation.

constituting a special feature. Each rod passes through a steel plate, and heavy nuts on the rod—one on either side of the plate—secure it in position. The plate is bolted to the crosshead by four bolts, a method which retains the advantage of being able to adjust the distance between the centers of the piston and crosshead with ease, when connecting or disconnecting the crosshead from the piston rod.

The guides are of circular form, 41 in. diameter; the beds are of massive design, of what is known as the "Mammoth" type; the drum-shaft bearings, which are cast with the beds, have the steps lined with special metal and are 21 in. in diameter and 33 in. long; the connecting rods have screw and wedge adjustment at both



THE 5500-HP. CORLISS HOIST SET UP IN THE SHOPS FOR TESTING

The corliss winding engine is one of two, both constructed exactly alike as regards size and design, to wind from the same vertical shaft, which has a depth of 3700 ft. The total weight of the engine is 275 tons; it occupies a space of 20 sq.yd., and the speed of winding is 3000 ft. per min., using superheated steam at 120 lb. pressure per square inch. The unbalanced load is 15.5 tons. The cylinders are 42 in. in diameter, with a 7-ft. stroke, and the valve gear is of the improved corliss type, placed on the outer side of the engine.

The valve spindles have spherical metallic packings, the end pressure of the valves being balanced by springs, while the eccentric shafts for operating the valve gear are connected to the crank pins by drag links. Possessing separate liners the cylinders are steam jacketed, each body being cast separately from the two end pieces which carry the valve chambers. The pistons are fitted with metallic packing rings, the outward pressure of which is adjustable, and the piston rods have a diameter of 8 in., being fitted with United States metallic packing. The crossheads are of steel with cast-iron adjustable slippers, the method of attaching the piston rods to the crossheads

ends; the drum shaft is 25 in. in diameter, having an overall length of 27 ft., and disk brakes are provided, operated from the driver's platform by foot, handwheel and screw.

A special feature in the design of the crank disks is that they are each made in two pieces. These disks are 9 ft. 2 in. in diameter, with center hub separate and having a flange cast on one end of it. The disk itself is bored to fit the hub to which it is keyed, and is also bolted to the flange, which makes it very secure and reduces the weight and overall dimensions of the drum shaft for transport. The drum is of the cylindro-conical type, of cast iron, built in sections, the conical part grooved for 1¾-in. diameter rope, the cylindrical part—which is 20 ft. in diameter and 8 ft. 9 in. wide—being plain. Two small internal drums, fitted inside the main drum, carry spare rope, which can be played out as required.

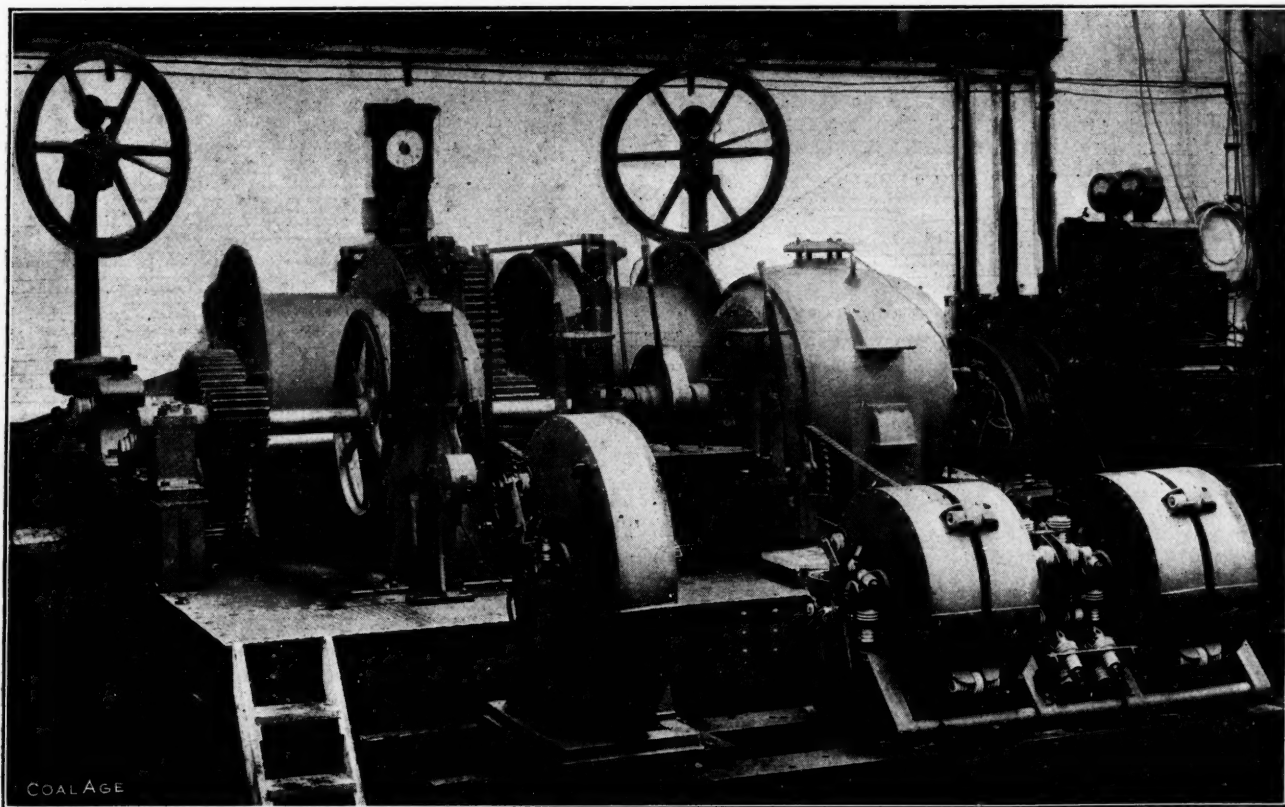
Two main brakes of the suspended curved post type, have power applied to both ends of the posts. They are operated by a steam-brake engine, the brakes being put on by means of a weight and held off by steam, which can

also be put on the top side of the brake-engine piston, if extra pressure is required. The brakes are adjusted automatically as the blocks wear. Reversing the engine is done by means of a steam reversing gear, having an oil locking and controlling cylinders. The main steam valve is $18\frac{1}{2}$ in. in diameter and of the single-beat type, the valve being balanced by a steam piston which makes it easy to operate. On the left-hand side of the engine is placed the driver's platform, with all the operating levers.

The governor is of the spring-loaded, high-speed type, and is very powerful. During acceleration, the engine takes steam up to about seven-eighths of the stroke, but when nearing full speed the governor begins to open, operates the cutoff gear and controls the speed of the

coal mine, the conditions of service are to bring a full set of loaded tubs a distance of 4000 ft. without the help of a descending set of empty tubs (although normally the tubs will run in balance) at an average speed of six miles per hour. The incline is 1 in $5\frac{1}{2}$, with steeper sections up to 1 in 3. One trip comprises 12 tubs, each weighing 6 cwt. and carrying 12 cwt. of coal; occasionally some of the tubs may be loaded with 20 cwt. of rock.

The drums are 4 ft. in diameter by 2 ft. 9 in. wide, each capable of holding 4500 ft. of $\frac{7}{8}$ -in. rope. The drum centers are of cast steel bushed with gunmetal, the sides being of mild-steel plates in halves bolted to the drum centers and stiffened by steel channels. Lagging for taking the rope is of cast iron in halves, strongly ribbed and bolted to the drum sides by $1\frac{1}{8}$ -in. bolts,



DETAILED VIEW OF THE 100-B.H.P., ELECTRICALLY DRIVEN HAULAGE GEAR

engine. Special attention is given to the lubrication and all steam cylinders and cylinder jackets are drained by means of steam traps.

The engine is fitted with Gott's controlling gear for preventing overspeed, overwind or starting in the wrong direction. In case of overspeed, in any part of the wind, the gear automatically shuts off steam and applies the brakes. It also operates in the same way if, on nearing the surface, the driver has not reduced speed sufficient to land the cage safely, or if the driver starts his wind in the wrong direction; that is, if he is taking the cage into the headgear instead of down the shaft, the brakes are automatically applied and the steam is shut off as before.

ELECTRIC HAULING GEAR

Coming now to the description of the 100-b.hp., electrically driven, double-drum hauling gear, for the Indian

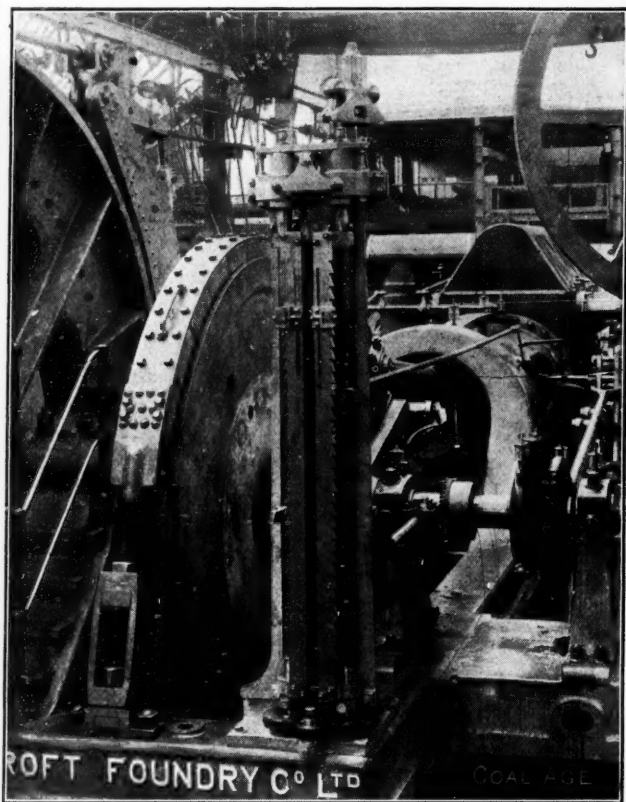
half of which pass right through the drum from one side to the other.

The brake rings are of cast iron, in halves, bolted to the drum sides, the clutches being of the cast-steel jaw type, the moving portion sliding on the hexagons formed on the drum shaft, operated by hand levers on the driver's platform; the drum shaft itself is of Siemens Martin steel, 9 in. in diameter, the outer bearings being 7 in. in diameter by 12 in. long. The countershaft is $5\frac{1}{4}$ in. in diameter. Each drum is provided with a strong brake of the post type, capable of holding the full load. Each brake can be operated independently by foot levers or by a handwheel and screw on the driver's platform, the latter being an extension of the bedframe and covered with chequered plate. This bedframe is built of mild-steel channels, having machined facings for the bearings and joggles to prevent lateral movement of the same, the side frames being of sufficient

height to raise the drums and gearing above the bottom of the bedframe.

Gearing is double reduction, motor speed 360 r.p.m. and drum speed 40 r.p.m. While the pinion on the motor shaft is of compressed paper, the other pinion and wheels are of cast steel having straight machine cut teeth. On to the extension of the motor shaft a brake operated by hand is fitted, and can be used in case of necessity. A magnetic brake is also fitted on the same shaft, and is automatically lifted off when the current is switched on to the motor, being again applied when the current is interrupted. The position of the tubs on the haulage road is given by a dial-type indicator for each drum.

The engine is driven by a Sandycroft-Hunt Cascade induction motor of the two-speed, pipe ventilated type, the machine being capable of giving a continuous output of



GOTT OVERWIND PREVENTION GEAR IN POSITION

100 b.hp. when running at a speed of 360 r.p.m., or 65 b.hp. at 240 r.p.m. Efficiency at the higher speed is 90 per cent., at the second speed 88 per cent.

The motor, which is controlled by two liquid switches of the Sandycroft patent inclosed type, is wound for a three-phase circuit of 2000 volts, 25 cycles. As the motor has to work in a hot, saturated return mine air, the insulation of the machine has been specially impregnated, and it is capable of giving the output stated continuously, the temperature rise not exceeding 60° F. Further, it can give at either speed an overload of 25 per cent. for two hours immediately following the full-load current—the temperature rise not exceeding 80 deg. F.

The lever mounted on the driver's platform operates the reversing switch by means of a side motion, and when moved backwards it operates a four-phase liquid switch, which is connected to the secondary stator tapings. If

it is desired to increase the speed of the winder to its maximum the second lever is brought into operation. This lever operates, by means of a chain, the liquid switch in the rotor circuit, and is connected to the three slip rings.

The magnetic brake is provided in addition to the hand brakes and this comes into operation on the opening of the static circuit or the failure of the supply, or by means of an emergency button in series with a no-volt release. Referring to the photograph, it will be seen that the switch gear is entirely protected by means of a wrought-iron case, containing a double-pole isolating switch.

✱ The Armies of Peace

BY BERTON BRALEY

Written expressly for "Coal Age"

No band precedes them on parade, no uniform they wear,

But armed with shovel, fuse and pick the underworld they dare.

They war against the inky dark, the overhanging shale
And all the perils that may mark a miner's burrowed trail.

Each day they seek the pit again to make the seam pay toll,

The armies that go underground to give the world its coal.

They face the ever-lurking damp, that strikes when all seems well

And turns the many workings to a fierce and flaming hell.

They take their chance with cheerful mien in dust and wet and mire,

They are not heroes to themselves—just workmen at their work.

And so they go about their task—to shoot and cut and hole,

The armies that go underground to give the world its coal.

They mine the gleaming anthracite to meet the need of men

(Forests of ancient ages which are brought to light again).

They mine the soft bituminous, a million boilers burn,
Which keeps the wheels of industry forever on the turn.

Of all the life we live today they are the very soul,

The armies that go underground to give the world its coal.

Our trains that thunder over land, on rails of shining steel;

Our ships that travel over seas, on swift and steady keel,

The fire that warms our houses and the light that keeps them bright

Are spoils of all the battles that these peaceful soldiers fight.

So let the trump of triumph sound, they stand on honor's roll,

These armies that go underground to give the world its coal.

A Gasoline Hoist at a Coal Mine

SYNOPSIS—It is ordinarily taken for granted that steam and electricity are the only forms of power that it is advisable to use for stationary work at coal mines. This article describes one of the exceptions to this rule, gasoline being so far ahead of these other sources of power supply that there was no hesitancy in its adoption.

✱

Although small hoists operated by internal-combustion engines have been in use for a number of years at some of the Western metal mines, an installation of this character in the center of a coal-mining region is decidedly an innovation. The Lehigh Valley Coal Co. has re-



THE HOIST HOUSE, LOCATED IN A LONELY PLACE IN THE WOODS

cently installed such a hoist at its Blackwood Colliery, near Pottsville, Penn., the machine being designed and built by the Vulcan Iron Works, of Wilkes-Barre.

The above named coal company was desirous of sinking a proving hole at a point which was a considerable distance away from their power house or any source of electrical supply. A careful investigation was, therefore, made of the cost of hoists embodying each of the three sources of power, namely, steam, electricity and gasoline.

This comparison was so far in favor of the gasoline hoist when used in this isolated position, that there was no hesitancy in making its adoption.

The machine was designed for the following service: Single-car trips are handled on a slope approximately 500 ft. long at an inclination of 40 deg. from the horizontal. The gross weight of car and coal is 4000 lb., and the cars are handled at a rope speed of 200 ft. per minute.

Aside from the motive power, the hoist is not materially different from those designed to be operated by electric motors. As will be seen from the photograph, the machine is self-contained, and may be readily transported from place to place. The drum is loose on the shaft, is driven by a band friction clutch, and controlled by the usual type of brake, operated by hand.

The driving engine is of the four-cylinder type, with a rated capacity of 25 hp., having cylinders 5 in. in diameter, with a stroke of 6 in. It is equipped with a speed-regulating governor, magneto, battery, intake and overflow water pipes, water circulating pump and intake and exhaust manifolds.

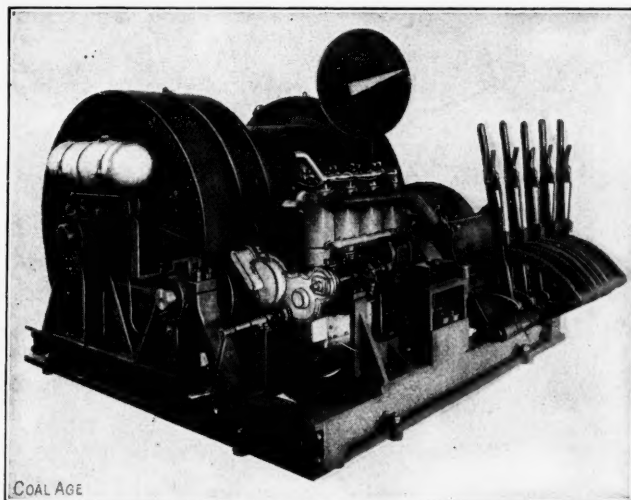
Owing to the conditions under which this machine operates, it is, of course, necessary to change the direction of rotation of the drum, and reversing gears are, therefore, provided for this purpose.

Although the cost of operation of a hoist of this type may be somewhat higher than that of an electrically driven machine of equal capacity the ease and cheapness with which it may be transported and set up more than offsets this when employed in an isolated position.

There is also the advantage that the fuel is easily transported and the danger from fire is probably less than with a steam operated hoist, all of the gasoline except what is in the tank on the machine being stored at some point outside of the hoist house, preferably in an underground vault or tank.

One of the principal difficulties experienced with hoists of this type which have been built heretofore has been that the torque was low in starting. In this particular machine, however, the capacity of the engine is sufficiently great to equal this condition.

This machine has been in operation for some time, and has, thus far, given entire satisfaction. It has, of course, its peculiarities with which the operator must become familiar, and which require decidedly different treatment from either a steam engine or an electric motor.



GASOLINE HOIST, SHOWING ENGINE, FUEL TANK, CONTROL LEVERS, ETC.

For instance, as the cylinders are water-jacketed, it is necessary to carefully drain this part of the apparatus and remove all water therefrom before leaving the hoist at night in cold weather; otherwise, the jacket would be liable to freeze and ruin the engine. This, of course, is one of the details of successful operation, but one which, nevertheless, is different from that of the ordinary motive power usually employed, and which, in winter at least, must not be neglected.

The internal-combustion engine is no longer either an experiment or an uncertainty. It is with us to stay, and, if properly handled, is fully as reliable as a steam engine, if not more so. Of course, it looks like "carrying coals to Newcastle" to employ an expensive liquid fuel at a coal mine, but in an instance like the one above described, where the position in which the machine is to be used is remote from any source of power supply, and, to a certain extent, temporary, the advantages attendant upon the use of this type of engine are self-evident.

An Important Advance in Coal Storage

BY WILLIAM E. HAMILTON*

SYNOPSIS—The elimination of breakage in the handling and marketing of anthracite coal is one of the serious problems of the hard-coal operator. Immense savings have been effected by numerous ingenious devices for reducing the severity of handling, with the consequent increase in the percentage of lower-priced grades. This article describes a storage plant of large capacity and embodying some novel and original appliances for the reduction of breakage in both storing and reloading coal.

It is estimated by A. D. W. Smith, of Wilkes-Barre, Penn., and William Griffiths, of Scranton, who have made investigations for the U. S. Geological Survey, that the

tanks, having conical roofs and floors. In the center of each tank is a hollow tower, containing a spiral chute, and a pivoted bucket conveyor, which operates in connection with the chute and a track hopper. Although the plan is new, the details have been heretofore tested and proved. It is a combination of old and well known ideas and principles, and its simplicity insures its successful operation.

The first aim is to reduce the loss in value of the coal, caused by degradation. This is an item, which, on a tonnage basis, often amounts to more than the cost of operation, and the cost of interest on plant investment, combined.† A great deal of machinery, costly to install and

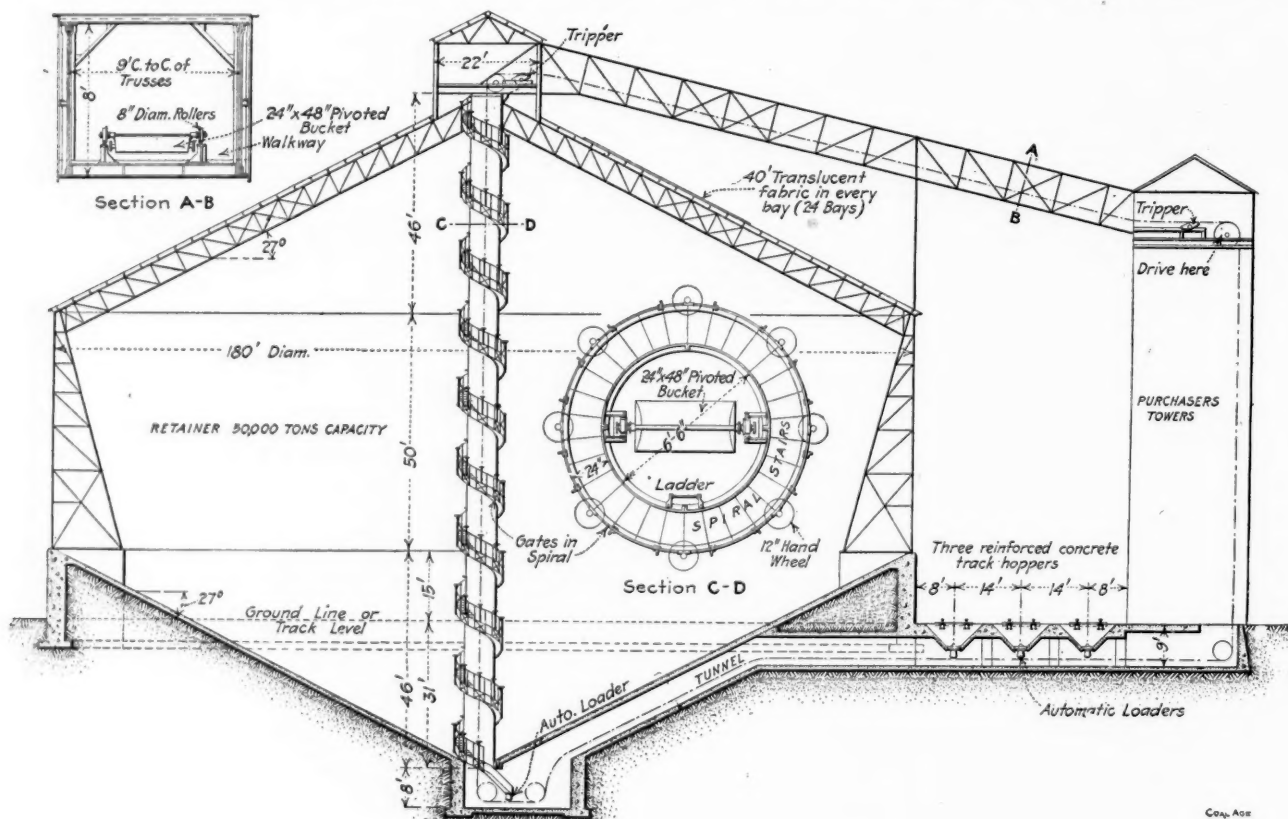


FIG. 1. CROSS-SECTION OF A SINGLE UNIT, SHOWING SOME DETAILS

anthracite coal will be exhausted in 104 years. It will therefore continue to increase in value, and this fact will necessitate more economical systems of handling.

The features to be desired in a plant to store and re-handle anthracite coal are the following:

- The least breakage of the coal.
- Lowest operating cost.
- Low first-cost, per ton of storage capacity.
- Least amount of labor employed.
- Least amount of machinery involved.
- Simplicity, and consequent freedom from breakdowns.
- Greatest storage capacity.
- Greatest strength in construction.
- Protection against fire, either accidental or incendiary.
- Protection against the weather.

The system herein described consists of cylindrical

operate, expensive to maintain, and destructive to the coal (through its chipping and flaking by abrasion), is dispensed with by this method of handling.

The number of transfers and the fall of the coal at these points has been reduced to a minimum. The rolling or sliding of the product upon itself is also less, by reason of the form of the retainer. (See Fig. 1.) The coal is carried on pivoted buckets, traveling on self-oiling wheels. A conveyor such as this, is 50 per cent. more durable and consumes less power than the scraper type.

†C. Dorrance, now chief engineer of the Lehigh Coal & Navigation Co., states that an increase of 1 per cent. in the steam sizes means an annual loss of \$75,000 to his company. See "Coal Age," bottom of second column, page 659, and also erratum, page 683, Vol. 2.—Editor.

*Engineer with the Jeffrey Mfg. Co., Columbus, Ohio.

METHOD OF OPERATION

The coal is received from the mines in cars which are "spotted" over the track hoppers. From these it is carried by wheeled bucket conveyor to the top of the retainers or tanks, where it is discharged into the large hopper of a covered spiral chute. It glides down and fills this chute and then sliding gates are opened successively, which allow the coal to flow out into the retainer or tank.

The spiral chute has a capacity greater than that of the bucket conveyor, and may always be kept full; the angle of inclination insures of the coal sliding, and there is no "internal movement" or "working" of coal within the chute, such as would cause grinding or abrasion. The

there are eight to each spiral turn, so that the difference in height between one gate and the next is very small, in fact, the top of one gate is higher than the bottom of the one next above it, so there is no falling of the coal. (See diagram.)

The gates are opened and closed, one after another, until the storage retainer is entirely filled, and the coal reaches the top of the tank in a conical pile, of which the hollow tower is the center, and the steel wall of the retainer is the circumference. In this construction the

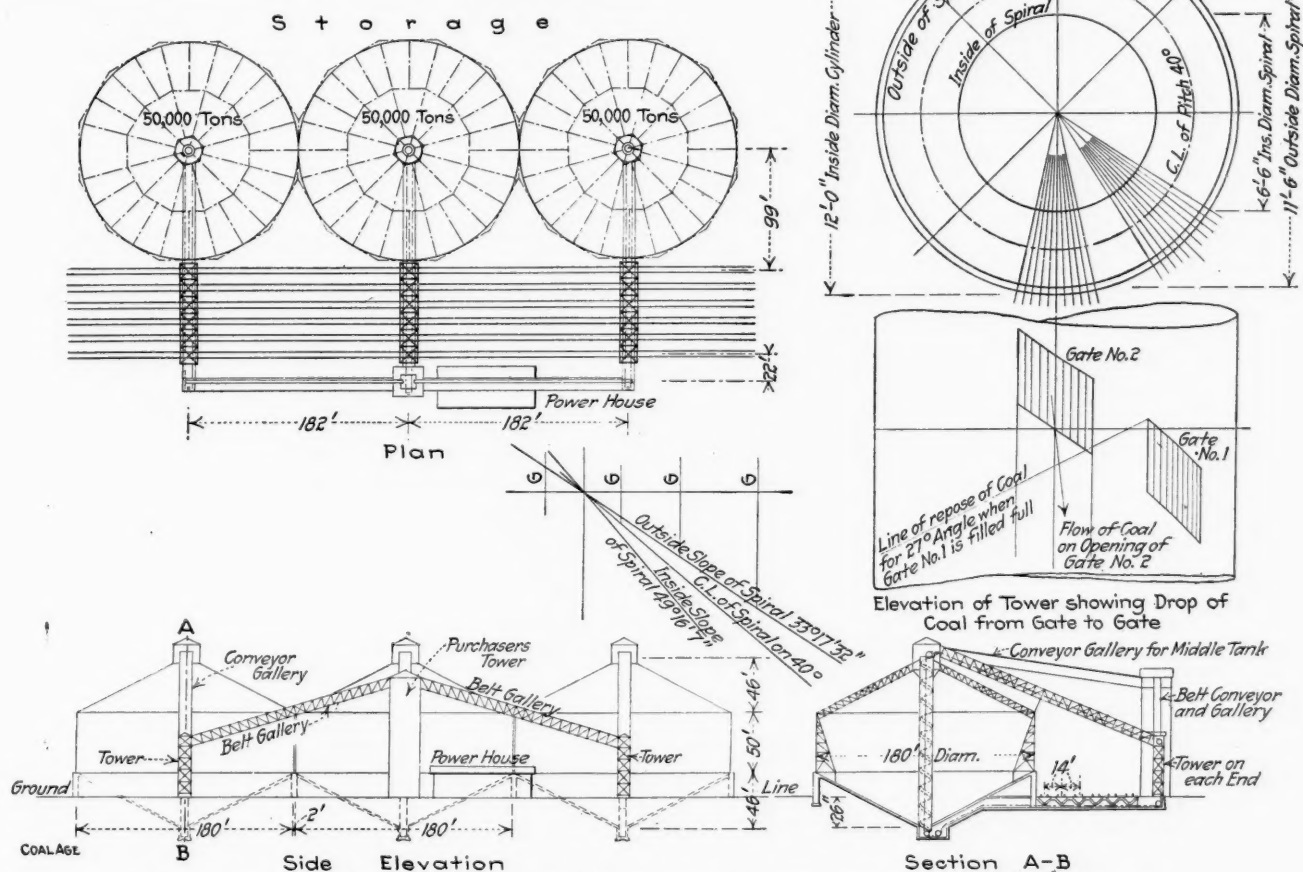


FIG. 2. GENERAL PLAN OF THREE UNITS AND DIAGRAMS SHOWING MAXIMUM FALL OF COAL

coal moves down the chute *en masse*, sliding on the smooth surfaces, and not grinding on other coal. The flow through the gates is regulated so as to keep the spiral chute filled, this being shown by its height in the hopper at the top of the tower. The buckets, after discharging into this hopper, travel on guides, down through the center of the hollow tower, and through the coils of the spiral chute. Passing out of the retainer at the bottom, they return under the track hoppers and are again filled and passed on to their discharge.

FACILITIES FOR STORING THE COAL

At the beginning of the operation of storing, all gates of the spiral chute are closed, except the lowest one, and the coal flows out of this and fills the lower part of the retainer. As soon as the coal has reached its level of repose in the tank, this gate is closed and the next higher opened. The gate-controlled openings are large, and

strains occasioned by this great weight of coal are equally distributed on the outer wall of the retainer.

RECLAIMING

In reloading (out of storage), the preceding operation is reversed. Beginning at the top, the gates in the spiral are opened successively as they are uncovered by the lowering of the coal in the retainer; thus the coal is drawn from the top of the pile, and never from the bottom under pressure of overlying coal. The only labor required is for opening and closing the gates, and even this can be done mechanically.

The travel of the coal is retarded by the turns of the spiral, so that the pressure at the bottom of the chute where the coal passes into the pivoted buckets, is only slightly greater than at the top, whereas, if this chute were vertical, straight and smooth, when full of coal, there would be a pressure of 2000 lb. per sq.ft. at the bot-

tom, for each 50 ft. of height. The weight of coal in the spiral chute is practically uniform at every turn, as it is not carried by the coal at the point of discharge; in re-loading (out of storage), there is none moved under pressure.

In this plan of "piping" the coal from the top of the pile, it is taken out of the center so that the pressure on the wall of the retainer is reduced equally in all directions, and it is uniform at all time and stages of both operations—like the pressure of water in a tank. The "internal working" of a pile of coal when drawn off from the bottom is apparent. A cone-shaped depression forms at the top and throughout the pile one piece of coal is grinding against another, chipping, flaking and breaking off the edges into particles too small to be of much commercial value.

Plants for the storage and recovery of anthracite coal involve the expenditure of a considerable amount of money. Only a few covered plants have been built, in fact, little advance has been made in this work in comparison with the general progress and improvement in other arts and industries.

From records kept at a number of plants, through several years of operation, the fact is disclosed that neither the first cost nor the operating expense is the principal thing to be considered. The loss in value of the coal from its "degradation" is a cost greater than any other. This degradation has not been materially reduced in late years, as the plants which have been installed have followed the original scheme of storing the coal in conical or rectangular piles and drawing it off either by tunnels, under the great pressure and weight of the overlying coal or by conveyors scraping against the side of the coal pile.

The system herein described provides protection against fire either accidental or incendiary, as no sparks nor flying embers can get into the inclosure; also in case of labor troubles, strikes and riots, there are no doors or other openings that give access to the coal where combustible material can be piled and fires started.

The circular tank or retainer is the strongest construction known. Likewise the capacity is greater than that of any other geometrical form of building, with the exception of a sphere; it also affords the greatest possible storage capacity for the amount of material entering into its construction.

❖

The German Coal Industry

The activity in mining and industrial enterprises in Germany continues unabated. Despite the coal miners' strike of last March and other impediments such as the chronic shortness of railroad cars, political unrest, etc., the production of coal in Germany has come up to 177,094,917 tons in 1912, as against 160,742,000 tons in 1911. Prussia alone produced 167,267,860 tons, of which 93,798,000 tons must be credited to the Dortmund district, while the administrative district of Breslau, comprising Upper and Lower Silesia participated with 47,272,579 tons. The production of coke amounted to 29,141,070 tons, also an increase over 1911, while 5,332,651 tons of coal briquettes were manufactured.

The production of brown coal or lignite likewise shows an increase, to wit, 82,339,588 tons in 1912, as against 73,516,789 tons in 1911. The production of lignite briquettes amounted to 19,058,000 tons.

By the Way

Many foxes grow gray, but few grow good.

❖

One man's story is no story—hear both sides.

❖

Little minds, like weak liquors, are soonest soured.

❖

He who strikes with his tongue must ward with his head.

❖

To believe a thing impossible is the one sure way to make it so.

❖

We are judged, not by our intentions, but by the result of our actions.

❖

We will walk a long time behind a wild goose before we find an ostrich feather.

❖

Wise men are instructed by reason, the ignorant by necessity and beasts by nature.

❖

It is said that Chamberstown, Chambersville and Pottsville, Penn., were all named after the same man.

❖

The man who starts out with the intention of doing no more than his part is apt to be satisfied with doing only a part of that.

❖

A state mine inspector of long experience in gaseous mines characterizes a nonreversible fan operating at a coal mine, as a railway passenger train minus the air-brake equipment. This is too practical an illustration to let slip.

❖

Press reports state that Josiah Van Kirk Thompson, the Pennsylvania coal and coke operator, recently paid \$1,000.000 for a divorce. We believe this establishes a new high record and it is worthy of note that coal men can head the list in more than one way.

❖

Morgan Kingston, a Nottinghamshire (England) miner, has signed a contract with Andreas Dippel, of the Chicago Opera Co., to appear as the latter's principal tenor, beginning October, 1913. Kingston was a miner for eleven years, but has been under the care of some of Europe's ablest vocal instructors during the past three years.

❖

The vote registered at a certain Western coal camp in 1910 was: Republican, 40; Democrats, 278. Two years later the vote was: Republican, 304; Democrats, 32. In explanation it is stated that the superintendent changed his politics during the intervening two years. Why such a man should waste his time bossing a mine is more than we can understand.

❖

Curious happenings are recorded even in England. A Nottinghamshire collier sold his wife for 24c. The man was drinking and his wife tried to persuade him to go home. Friends joined their entreaties to hers and this so incensed him that turning to one of them he shouted: "Does tha' want 'er Tha' can 'ave 'er for a 'bob." The offer was promptly accepted and the woman "changed hands." The husband has since repented his sorry bargain, but his wife prefers the new order, and is obdurate and apparently content. The husband has invoked the aid of the guardians of the peace, but in that quarter has met with little sympathy. The woman's husband and present owner are "old friends."

❖

In the discussion of an interesting paper on the "Structure of the Northern Anthracite Basin," presented by N. H. Darton, geologist of the U. S. Bureau of Mines, at the November meeting of the New York Section of the American Institute of Mining Engineers, the question was asked as to the quality of coal that is being mined at present in the anthracite fields. Mr. Darton replied that the operators are endeavoring to conserve the coal fields in that region and are shipping as low a quality of coal as the market will take. He stated further that if the market demands high-grade coal it can be delivered, as there still remain millions of tons yet unmined.

A Monitor Gravity Plane at Penn-Mary

By R. DAWSON HALL

SYNOPSIS—No. 7 mine of the Penn-Mary Coal Co. dumps its coal near the drift mouths into a bin. The coal is loaded as required into a large car or monitor holding 15 gross tons, which, running to the bottom of the plane, draws an empty monitor up the hill to take its place. The coal on reaching a bin at the foot of the hill is discharged, and is allowed to fall thence at will into railroad cars.

The Penn-Mary Coal Co. is most successfully operating a monitor gravity plane at its No. 7 mine. The cars after leaving either of the openings pass over automatic scales. One front wheel operating on a lever sets these scales in operation, and the corresponding rear wheel throws the scale out of gear. The weight of the load in the car is automatically registered on a paper tape, as shown in the illustration. The upper printed figures in Fig. 1 represent thousands; thus 3 in the upper part of the diagram denotes 3000 lb.; the lower figures represent hundredweights. It will be seen that the arrow lies between 3200 and 3100 lb. and that the actual weight of the car evidently approximates 3120 lb. because the scale divisions each correspond to 25 lb.

REDUCING WEIGH SCALE WORRIES

The figures written cursively on the diagram are those placed there by the weighman or clerk and were copied from the check numbers taken off the cars as they passed over the scale. It would not, of course, be necessary to employ a weighman. The check numbers could be placed in order on a file and by reading the values on the tape and the check numbers on the file in due order, the tonnage corresponding to each check number could be ascertained at the end of the day.

crated successfully by unintelligent men, they are sure to be extensively introduced at all tippie scales. They are made by the Streeter-Amet Weighing & Recording Co., of Chicago, Ill.

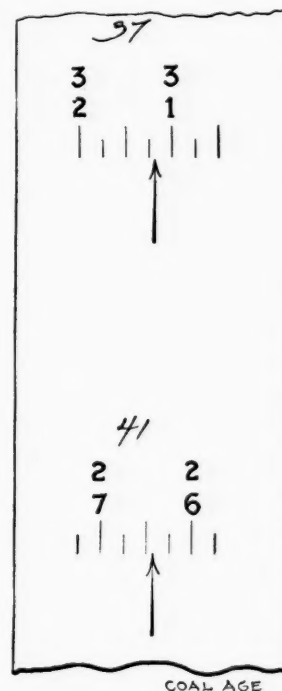


FIG. 1. RECORD OF COAL TONNAGE OF INDIVIDUAL CARS

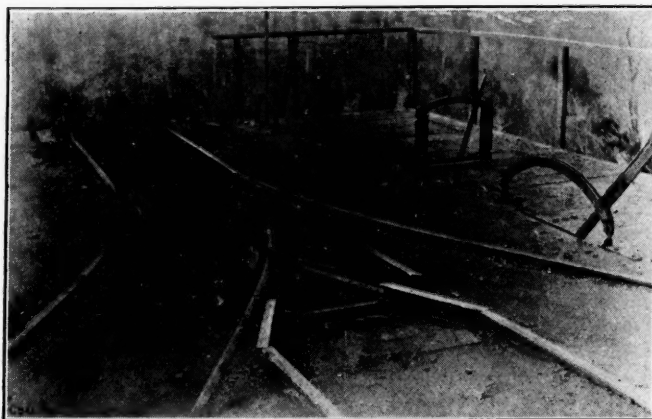


FIG. 2. THE SWITCHES OVER THE UPPER BIN, PERMITTING RAPID DUMPING OF COAL

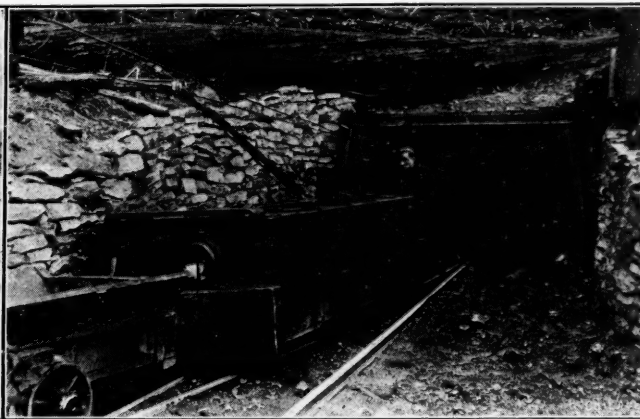


FIG. 3. AN ENTRANCE TO NO. 7 MINE, SHOWING IRON-RAIL TIMBERS AND A BALDWIN-WESTINGHOUSE MOTOR

The system is most expeditious, gives satisfactory results and a permanent, unanswerable record, and the Penn Mary Coal Co. is well satisfied with its operation. They do not, however, leave the recording of the check numbers till evening, but note them on the tape as the cars are dumped. Scales of this type have had a far larger application to railroad work than to mining, but because they are automatic, rapid and accurate and can be op-

A TIME-SAVING TIPPLE SWITCH

The coal after being weighed passes in the car to the upper bin. A clever arrangement of switches has been devised by H. P. Dowler, the manager of the company. It will be noted that both rails of the straight track leading to the dump are broken so as to form latches. These portions of the rail are connected by spiral springs. When the loaded car is pushed forward, the rails are forced out



FIG. 4. THE MONITOR GRAVITY PLANE AT PENN MARY No. 7, HEILWOOD, PENN.

into line and the car passes on a solid track. As soon as it has passed, the track is broken and is so disposed that empty cars can pass back on a rail just below the loaded track, either to the right or left.

As the grade of the plane was excessively steep, a simple kickback dump was necessary to save the expense of high trestling which would have been involved had a crossover dump been installed. The switches for the load track and the two empty tracks are all together and are controlled by one and the same lever and are set so close to the dump that the operation of the parting is simple and rapid. This is necessary as the cars are small and have to be handled with rapidity if a large tonnage is to be obtained. By setting the rails in solid concrete, the switch rails are made so stiff that it is impossible for them to get out of alignment. Thus derailments are avoided. The immediate track grades leading to the tipple and away from it, are 2 per cent.

The bin at the head of the plane holds 43 tons and dumps into a monitor with a rated capacity of 12 long tons. It is customary, however, to load it with about 15

tons. The box of this large car—one is almost moved to term it a traveling bin—is 12 ft. long and the height of its upper edge is 7 ft. 10 in. clear of the 60-lb. rail on which it runs. Its length is 15 ft. over all, the wheel base 4 ft. and the gage 4 ft. 8½ in. There is only one switch on the plane and that is near the top. Under the upper bin, the monitors occupy in turn the same rails, but they are switched to a separate track at the parting, to which reference has just been made, and each dumps always into its own portion of the lower bin.

The monitor has three hoppers and these are raised by winches which are held in place by pawls. They can be so arranged that a rod projecting from the end of the car and striking a bumper will release all the pawls at one time and dump the monitor almost instantaneously. This, however, has not been placed up to the present date on the Penn-Mary monitor.

SPOTTING THE RAILROAD CARS

The monitors dump into a large bin holding about 50 tons and having three chutes discharging endwise into

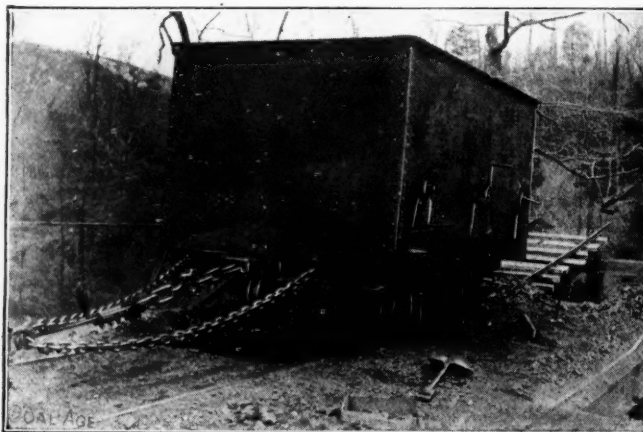


FIG. 5. MONITOR OVER LOWER BIN

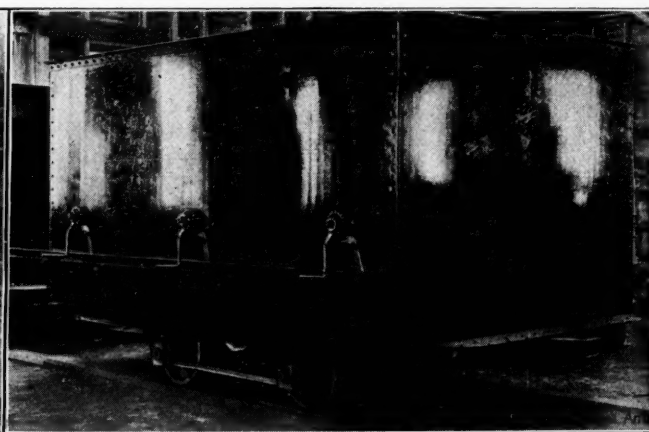


FIG. 6. CAR EQUIPPED FOR AUTOMATIC DUMPING

the railroad cars below them. These chutes are controlled from a dumping platform by the long levers shown in Fig. 7. In order to reduce the labor needed, the railroad tracks are set at a grade of 2 per cent. and the cars are controlled by the use of a Fairmount Machinery Co.'s car retarder, which enables one man to spot the car within a few inches of the desired place. The man in Fig. 7 has his hand on the controlling lever of

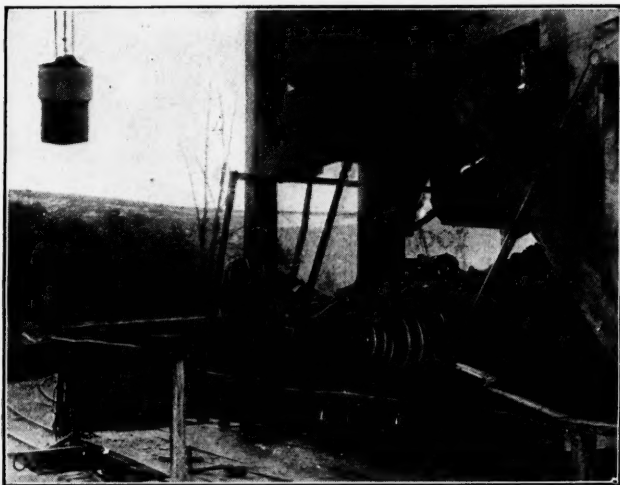


FIG. 7. THE CAR RETARDER AND DUMPING LEVERS

this device. By gently lifting on this controller, he permits the car to travel forward as desired.

The grades near the top of the plane are from 20 to 25 per cent. At the steepest point the grade is 38 per cent. The approach to the tipple is, however, only about 8 per cent. This easy grade at the foot involves allowing the monitors to travel at some speed. At the same time they must be under such control that they can be stopped at any point on their travel. This is done without difficulty with the two sheaves shown in Fig. 8. This photo-

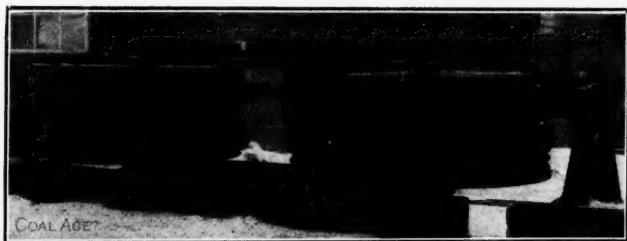


FIG. 8. THE FIGURE-OF-EIGHT SHEAVE WHEELS AND BRAKE

graph was taken in the factory as it was impossible to get a good view of the machine in position.

HOW THE MONITORS ARE CONTROLLED

The rope winds in the form of a figure-of-eight between the two sheaves and thus has sufficient turns to make a firm contact, so that it is prevented from slipping under the most untoward circumstances. The brake band being cast integral with the sheave wheels absolutely restrains both them and the rope, when the brake is applied. The bands are 18 in. wide and there is only one to each sheave, and as this is on one side only, it would tend to throw the bearing out of line. Attempts have

been made to correct this by putting brakes above and below each sheave. This puts the lower bands in an undesirable position.

Consequently, a single band is preferable and in order to avoid the possibility of breaking the wheel or of wearing the bearing by excessive unsupported strain, the band in this machine is reinforced by being connected with four arms to another bearing on the same shaft. This keeps the wheels true and safe under any load the checker can throw onto them. In fact, the monitor system has been rendered so reliable that grades of 70 per cent. have been fitted out and operated with entire success.

At Penn-Mary No. 4, a mine recently worked out, monitors controlled by figure-of-eight sheaves were in use from 1906 to 1912. The outfit was slightly smaller than that now in operation at No. 7, but it handled 322,947 tons in that length of time and cost only \$4 a year for renewals. The only parts to be renewed were the brake blocks. No repairs were needed.

LESSENING FRICTION OF FAN

No. 7 mine is ventilated by an 8-ft. disk fan with Hyatt roller bearings. There has been no test made to

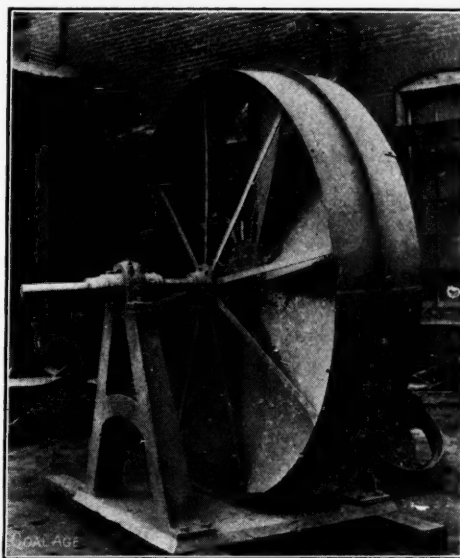


FIG. 9. AN 8-FT. J. C. STINE FAN WITH HYATT ROLLER BEARINGS

determine the saving effected by the use of this anti-friction device, but the Penn-Mary Coal Co. is expecting to equip another of its fans in a short while with the same improvement as it is sure that the economy effected in the use of roller bearings fully justifies their use. The fan installed will be replaced by a larger one of the same type when more air is needed. It is rotated by a $7\frac{1}{2}$ -hp., shunt-wound, 590-r.p.m., 220-volt motor which takes a full load current of 28.7 amperes. The track running up the side of the plane, Fig. 4, is for the transportation of supplies. A Lidgerwood hoist electrically driven is kept at the head of the plane for that purpose.

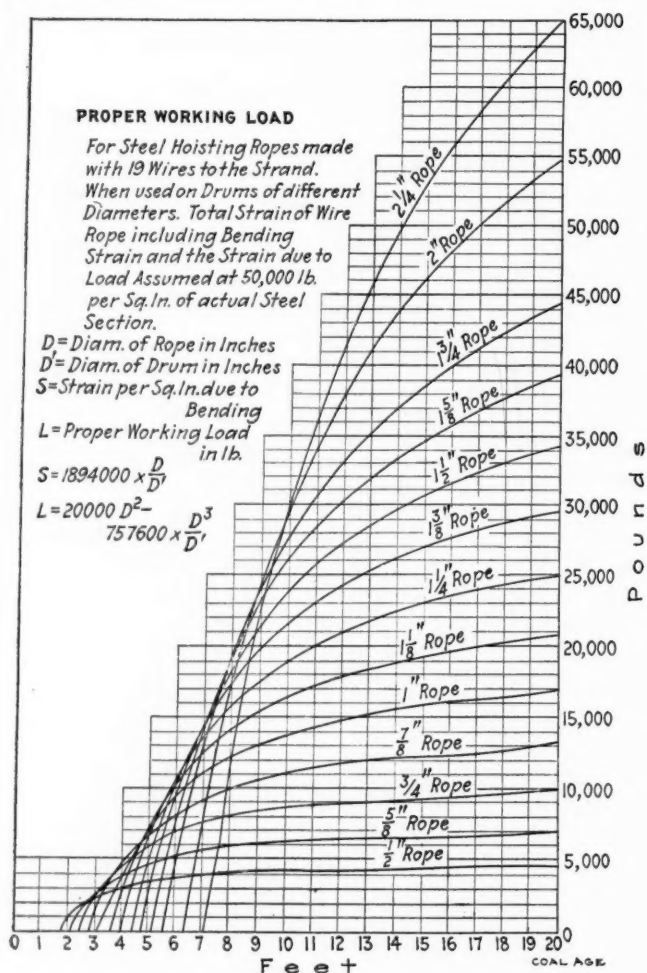
The monitors, figure-of-eight sheaves and the fan mentioned were supplied by J. C. Stine, of Tyrone, Penn. H. P. Dowler is general manager, M. H. Kallaway assistant and J. T. Hoover chief engineer.

Steel Hoisting Ropes

BY GEORGE L. PHILLIPS*

The agent through which the power developed by the hoisting engine is transferred to the cage with its car of coal anywhere from 50 to 2000 ft. down at the shaft bottom, is the wire hoisting rope, and upon its quality and power of transmission rests the efficiency of the hoisting apparatus.

Steel hoisting ropes are used at all shafts, those best suited to the work having six strands of 19 wires each, of medium steel and having an ultimate strength of from 60,000 to 70,000 lb., the working or safe load being obtained by employing a factor of safety of not less than five. The character and quality of the steel, as well as the lay of the strands, play an important part in the life of the rope, the continuous bending and straining to which it is subjected making it necessary to look closely after these details. A poor steel rope becomes brittle as a result of continuous bending, over a sheave which is perhaps just a trifle too small, and the individual wires soon begin to break.



SAFE WORKING LOADS FOR STEEL HOISTING ROPES

Given the proper kind of rope, as above stated, and with reasonable care as to the kind of oil or lubricant used (one part of linseed oil to one part of lamp black being a good preservative) and the right kind of judg-

*205 South Main Ave., Scranton, Penn.

ment in the selection of pulleys and sheaves, and the maximum of efficiency can be obtained.

We herewith submit a diagram of the safe loads that can be carried by ropes of a given diameter over sheaves of a given size. The abscissas are sheave diameters in feet and the ordinates safe loads in pounds. Along the curved lines will be found the diameter of rope in inches.

For instance, should we desire to ascertain the safe working load for 2-in. rope on a 12-ft. drum; we find by tracing up the 12 line until it intersects the 2-in. line, that the corresponding ordinate gives 38,000 lb. Where the 2-in. line crosses the 2 1/4-in. line will be the minimum size of sheave for a 2-in. rope.

Production of Coal

Seventeenth Bituminous District (Pennsylvania)

Following is the production of coal in the 17th bituminous district of Pennsylvania, for 1912, showing the tonnage of each mine in the district, and its distribution in the counties:

Company or Operator	Short Tons
Pittsburgh Terminal Railroad and Coal Co.	2,360,163
Pittsburgh Coal Company	1,937,974
New York and Cleveland Gas Coal Company	371,283
Crescent Coal Company	317,401
Pittsburgh-Buffalo Company	275,224
Youghiogheny and Ohio Coal Company	250,803
Monongahela River Consolidated Coal and Coke Company	250,783
Mans Williams Coal Company	28,561
Oilet Brothers	21,452
Paul Coal Company	14,491
Sorg Brothers	11,449
Vogel and Weinman	7,484
Samson and Hormel	7,482
W. S. B. Hays	6,950
Weinman Brothers	5,894
Steele and Scott	5,350
James T. Fox	3,725
Bureau of Mines	3,674
Shearn Brothers	3,423
John Peterman	3,223
Production by Counties	
Allegheny County	5,729,361
Washington County	157,428
Total	5,886,789

Record of Charleroi District, 1912

Last year's coal production in the twenty-first inspection district of Pennsylvania while 3 per cent. (213,322 tons) larger than the year before, would have increased still more had it not been for the freezing of the Monongahela River in the months of January and February, which caused navigation to be suspended for about three weeks. Furthermore, there was another suspension of equal duration in the month of April pending the signing of the scale by the United Mine Workers of America and the operators. The labor shortage also resulted in a further restriction of output.

There were 22 fatal accidents in the mines, 13 less than in 1911. This is a decrease of 37 per cent. They can be classified and compared with those in 1911 as follows:

Causes	CAUSES OF DEATH, CHARLEROI DISTRICT	
	Per cent. 1911	Per cent. 1912
Falls of coal	11.43	18.13
Falls of drawslate	34.28	13.63
Falls of roof	11.43	9.10
Electricity	11.43	13.63
Mine cars	28.57	36.36
Miscellaneous	2.86 (blasts)	9.10
	100.00	100.00

It will be noticed that accidents from falls have materially decreased, but there has been an increase in accidents from mine cars owing to the large steel cars used in two of the largest mines. Of 6735 persons employed at the mines only 240 are between the ages of 16 and 21 years. The majority of these young men are 19 years old. The number employed above ground between 14 and 21 years of age is 91. None of the mines used compressed-air mining machines. By hand picks, 1,787,697 tons were mined; electric machines undercut the balance of 5,141,536 tons.

EDITORIALS

Hoist Evolution

The methods employed for raising coal from the mines have probably been as numerous and varied as those devised for its transportation upon the surface.

To begin with, baskets or boxes were strapped upon the backs of carriers, usually women, who toiled laboriously up and down ladders or crude stairways. Then came the windlass and rope with a bucket attached to the end; next the winch or sweep mill, to which a horse, mule or ox could be hitched, the bucket being slowly raised by the animal walking endlessly round and round.

Finally, with the utilization of steam and the development of the steam engine, this machine was quickly adapted to the hoisting of coal, which service, until very recent years at least, it has performed to the almost entire exclusion of all other devices.

Within a comparatively short time, however, the electric hoist has come into extensive use and has proved itself as reliable and satisfactory as the time-honored steam engine. Its employment obviates the necessity of providing a boiler plant at each mine, and allows the complete centralization of power, which is always conducive to economy.

The electric hoist possesses other advantages over the steam engine, chief among which might be mentioned its adaptability to distant control. With a motor-driven machine it is quite possible, even convenient from the electrical standpoint, to place the operator near the point where the load hoisted is discharged into the bin or chute. He is thus enabled to watch all that goes on in the dumping process. And, although this arrangement will probably in no wise increase the efficiency of the hoist or affect in any way the number of horsepower-hours necessary to raise or prepare a ton of coal, it will undoubtedly have an influence upon the regularity of hoisting operations and will reduce the liability to hoisting accidents.

✱

Lonely Virtue

The Director of the Bureau of Mines appeared before the Committee on Public Buildings and Grounds, and made the following statement. It is sent to us for publication, and we will not give it a lowly place, but quote it in our editorial columns, for we know our subscribers will want to read it.

What is more we will not edit it as one of our distinguished contemporaries did, before putting it into circulation, and we will not write the words "contributed to" in place of the bolder word "yielded" in the quotation we make. "The work," says Doctor Holmes, "such as we have been able to do in our present location within the past year, has *yielded* a reduction in the annual loss of life of not less than 500, but the great loss is still a discredit to the nation."

This gasconade reminds us of the Andalusian peasant,

who, as Washington Irving records, declared, "When I draw my sword, the earth trembles" (*tiembla la tierra*). We can forgive a little self-esteem in a bureau doing good work like the Bureau of Mines; we can condone a trifle of excess self-adulation in a body seeking to establish itself and needing funds to make such establishment possible; we can excuse some exaggeration, remembering that a diplomat has been described as an honest man who makes misstatements for the good of the commonwealth; but to rob our philanthropic companies, which have spent their millions for safety, of the honor due them, to overlook the original work all over the country, and to remember only the propaganda of foreign experiments which, as far as safety is concerned, has replaced original research in the Bureau of Mines, is ungenerous and unfair.

We hope Doctor Holmes will get his appropriation of a half million of dollars. The Bureau needs it and its members deserve it, but we also hope the claim that the Bureau alone is the cause for the growth in mine safety will never be made good, no matter how faithfully its attachés serve the nation. The mining public will do its part, no matter how severely its Bureau may misrepresent its actions.

✱

To Regulate the World's Output of Coal

The Miners' Federation of Great Britain has recently made public the report of the International Miners' Congress, which was held at Amsterdam, Holland, July 12, to formulate, if possible, an international rule to regulate the world's output of coal.

The British miners are now voting on the question of only working five eight-hour days each week, which is so far reported as follows: For, 231,741; against, 171,270.

The American report did not make any recommendations, merely giving statistics of American production. After the vote of the English miners has been carefully considered, the International Committee will probably draft a plan which, in their judgment, will be best adapted to regulate the world's output of coal.

It should be remembered, however, that even if a five-days-a-week working policy were adopted in all coal-producing countries, the output, if limited at all, would be so only temporarily. Such a plan could not permanently regulate the supply of coal. New mines would be opened as fast as needed.

If, however, the miners should appoint an international committee having power to recommend at any time a reduction of working days to four, three, or even two per week, for a prescribed period, the production of coal might be regulated as desired. This latter statement, of course, assumes that the unions in the different countries would be able to enforce or carry out the recommendation of the international committee.

If such a bold plan on the part of the coal miners in all countries could be consummated, the various governments would then have on their hands a trust of such vital importance as to justify their closest attention. New evidence is being brought forward every day that labor will have to be regulated by federal control precisely as we now attempt to regulate industrial corporations that have become too dangerous for public welfare.

✱

Mine Telephones Made Compulsory

A law that becomes operative Apr. 1 in Great Britain compels all mines to have telephones installed when the point of entrance is more than 1000 ft. distant from the workings.

Legislation having the same object in view would not be out of place in the United States. There is no device more urgently needed, in case of trouble underground, than the mine telephone. In a few years any mine unequipped with a complete telephone service will be looked upon with the same misgivings as are aroused by a commercial enterprise lacking such service today.

✱

Railless Coal Transportation

It is rather surprising to find such a well informed publication as the *Wall Street Journal* giving credence to the somewhat visionary plan of transporting coal by pipelines. In a recent issue, however, it publishes a telegram to the *Manufacturers' Record*, from a "drainage engineer" in Chicago, which reads: "Developed a project for transporting coal hydraulically for 96 miles, divided into six equal sections. Pipe 18 in. in diameter; 6 ft. per second; resulting economy very great." Whether the proposition is "developed" on the ground or only in the brain of the inventor, is not stated, but we venture to believe that it has not yet outgrown the latter embryo stage.

The idea apparently originated from watching the results of dredge pumps working in Lake Michigan, where material up to 6 in. in diameter is pumped half a mile. Perhaps it was thought that this was a new departure in the science of engineering, when as a matter of fact it has long been recognized as a standard method of handling material, within certain limits. That these limits have a radius of 96 miles remains for the inventors to prove.

It is hardly to be presumed that they expect to transport anything other than the finest sizes; obviously, the largest lump would be reduced to an almost impalpable powder at the end of its 96-mile jaunt in the restricted confines of an 18-in. pipeline. In fact, innumerable physical conditions might be cited, any one of which would show the utter absurdity of the scheme. For instance, it is doubtful if the inventors have considered the mere detail of wear and tear on the pipeline. This question was first brought into prominence on the mammoth fill made by the Chicago, Milwaukee & Puget Sound Ry. near North Bend, Wash., which was accomplished by hydraulicking. In the sluiceways, sheet-iron, cast-iron and even steel plates were worn away with surprising rapidity, and it finally became necessary to resort to removable wooden blocks.

It has long been conceded that enormous losses are in-

involved in the handling and various processes to which coal is subjected before it is resolved into actual power. But we do not believe this new solution to be worthy of serious consideration. The more conservative engineers are, however, beginning to regard long-distance electrical transmission as a fruitful field for investigations along this line, and the next few years will doubtless see a more general adoption of this method. Already the Lehigh Coal & Navigation Co. has a large installation of this character under construction, which will transmit power over a radius of 175 miles. We recommend this method to the consideration of the "pipeline" promoters.

✱

How Our Plants Are Built

It is a healthful exercise for a mine superintendent to look around his plant and determine just how many of the features in his operation are the result of his own devising. The number of these is not large. Most of his improvements arose from the prompting of a catalog, a technical journal, a government bulletin, of a sales agent or of someone whom he happened to meet or who strolled into his plant.

His vaunted operation is based on other men's ideas, and his work has been largely that of an adapter, not of an inventor. This being the case, why do we not put ourselves in the way of learning more? Why do we stay in one place till the new idea is forced upon us? We will learn it sooner or later, but if we grasp it and adopt it now, we shall receive enough profit from its use to pay for its installation and for our search after it, long before we would otherwise have been brought face to face with it, had we waited till it traveled our way. We shall make such an improvement before long; why not now?

The bituminous coal field has undergone a different development from the anthracite because its problems have been slightly different. The minds of its superintendents, engineers and manufacturers have been concentrated on these peculiar difficulties, and machinery has been devised to meet these problems. The bituminous region has like questions to solve but in a minor degree. They are overshadowed by other difficulties and have therefore received only casual attention. Consequently, when the bituminous mine manager goes to the anthracite region, he learns how the hard-coal operator has solved many of the problems which also vex him—problems on which he has not concentrated all thought and energy, but which are nevertheless of great importance in the conduct of soft-coal mines. We mention as examples, the matter of sizing and cleaning coal and disposing of waste.

The Coal Mining Institute of America is going to hold its summer meeting at Wilkes-Barre, Penn. There will be an excellent opportunity to see the great anthracite industry at its best and in the most intimate way. It seems fitting that every member of the Institute should be present. We wonder why the operators do not insist on every member going instead of granting a grudging permission to a few. We can almost as readily understand the purpose of a manager who discourages the reading of technical papers or of publications of the Bureau of Mines as we can the intent of one who does not lend every encouragement to those desiring to view practice in other fields.

DISCUSSION BY READERS

Seven Shifts a Week

I am not sure whether it is wise to sympathize with "Mine Foreman," Collinsville, Ill., COAL AGE, Feb. 15, p. 272. The idea of being on the job "almost day and night"; "living, eating and sleeping" on the job; working "48 and 60" hr. (2 to 2½ days) without going home and making "from 7 to 10 shifts a week" is beyond the average human capacity for endurance.

A man might as well be in the penitentiary at once. We may assume from his letter that this man works for a large company and should have assistants. If he has brains, he should be able to share the responsibility with his assistants, provided they are not mere imitations of himself. Perhaps their brains have been numbed by the continual grind of work.

I am heartily in accord with the previous article by a Colorado engineer, COAL AGE, Jan. 18, p. 88, in which he describes seven shifts a week as "a fallacy." Statistics have shown that men are more efficient working six shifts a week, instead of seven. The man who takes his rest day every week is the man who is ready for emergencies when they arise.

The man of initiative and the man of ideas is not ordinarily the man who sleeps with his job; but rather the man, who, when the day's work is over, takes up some hobby or other occupation apart from his day's work. This is the man who systematizes his work so that it can generally be accomplished on the regular working days or nights, as the case may be.

There is unquestionably some necessary work that must be performed on Sundays; but the extra "Sunday job" should be made the exception and not the rule. I will guarantee that if the Collinsville "Mine Foreman" will follow this suggestion, and use the six shifts a week to the best advantage, he will prove a more useful and valuable man to his company. In closing, I may express the hope that no calamity of any kind will occur that would make me dependent on the service that this man would be able to offer, as I could scarcely expect any bright ideas or help from him.

STATE MINE INSPECTOR.

—, Illinois.

*

Allegheny Valley Price Quotations

A number of local operators are desirous of having Punxsutawney price quotations listed separately in COAL AGE, instead of including them in the general Allegheny prices as you do. Will you kindly advise us why you do not do this.

J. G. STEINER.

Knoxdale, Penn.

It appears that the old difficulty in regard to quotations on coal produced in the territory between Buffalo and Pittsburgh has come to the surface again. The plea is that "our coal is so much better than the run of it in the

Allegheny Valley and neighboring territory that we ought to be taken out of the list and given a special price in the market quotations." On the face of it, this always appears just and proper, for no doubt the coal in question is above the average.

The trouble is there are others in the business in the same territory who also would like to obtain help in booming their coal. Some of them are entitled to it while others are not, and the worst of it is that there are also certain mine owners who have high-grade coal coming from one mine and quite a different grade from one or more others. Ask any old Allegheny Valley operator about it and he will say that he knows of certain concerns, with a limited amount of really good coal and a lot of poorer grades, who are selling the good fuel four or five times over. The consumer comes to know which mine's output suits him best and he always asks for that coal.

The fact is that in the Allegheny Valley and vicinity there are grades and grades, all of them varying according to some geological condition. All that the public is likely to find out is that such a mine has the reputation of producing good coal, while another does not enjoy that distinction. Now and then there is a jobber or consumer who claims to be so well acquainted with the different coals that he can recognize at sight the mine any coal comes from, but this is subject to doubt in most cases.

It is, therefore, quite out of the question to quote special prices in a general district, unless some mine or mines turn out a very distinctive sort of coal, such as smithing or cannel. There are mines which are known to be better than others, but the producers will not agree as to which they are. There are so many operators who hold their coal above its actual grade that any effort to distinguish between ordinary coals in a single district, for the purposes of quotation in print, is certain to lead to endless disputes. The writer speaks from experience.

"BUFFALO."

[These remarks are well justified. The Allegheny Valley operators mine coals from several different beds, the Upper and Lower Freeports, the Lower Kittanning and the Brookville. In some sections of the East only one bed, the Pittsburgh, is mined, so there is no uncertainty as to the seam from which the seller receives his coal. Of all the beds in the Allegheny Valley region, the Lower Freeport is the best. The Upper Freeport and Lower Kittanning are of about equal value and the Brookville will run the whole gamut from the best to the worst, so varied is its quality. The Lower Kittanning varies considerably from place to place; sometimes it has much bone in the roof coal and sometimes but little. In dips, it is apt to be streaked with sulphur, but it is also, in a few places, extremely dirty on sharp ridges. Most of the large companies are mining both beds of coal and some were at one time dumping them into the same cars, so that they themselves did not know the actual value of the coal they were shipping.—EDITOR.]

Oxygen Supply and Mine Explosions

The recent discussion on reducing ventilation when firing has proved both instructive and suggestive as showing the effect of a limited supply of oxygen in restricting combustion and preventing mine explosions. This seems to me one of the most serious and important subjects connected with coal mining and one calling for the most careful consideration.

The rapidity and intensity of all forms of combustion depend on the amount of oxygen available to support the combustion. Both gas and coal-dust explosions are but forms of very rapid and violent combustion, and there can be little doubt, therefore, that the violence of the explosion can be controlled, to the extent that we are able to regulate the supply of oxygen.

In case the ventilation in a mine has been stopped and no air is moving, there is still sufficient oxygen present, in the mine atmosphere, to support a gas or coal-dust explosion when the first shots are fired. As the firing proceeds, however, where gas or dust is present much of this available oxygen is consumed by the combustion of the gas or dust. Now, if no more air is allowed to enter the mine, during the time the shots are being fired, there can be little doubt but that the chances for an explosion will be lessened; and if an explosion should then occur, its violence and extent would not be as great as if a large volume of air was in circulation.

Again, when the dust is stirred up and blown into the air by the concussion of the shots, it will settle much quicker in still air than when there is a strong air current passing, which holds it in suspension. This soon produces a dusty atmosphere that is readily fired by the flame of a heavy or windy shot should such a shot occur.

If we can take as correct the figures of Dr. J. Harger, which he presented recently to the Society of Chemical Industry, at Liverpool, England, it is surprising what a slight reduction in the oxygen content of the air is necessary to produce a marked effect on combustion. According to these figures, a reduction of from 1 to 2 per cent. in oxygen, together with an addition of from $\frac{1}{2}$ to $\frac{3}{4}$ per cent. of carbon dioxide, will render a firedamp mixture nonexplosive. This statement is said to apply also to an explosive atmosphere formed of coal dust suspended in the mine air.

Dr. J. S. Haldane, in his description of the Haldane flame test for oxygen, states that the light of a candle or lamp is diminished 30 per cent., by a decrease of 1 per cent. in the oxygen content of the atmosphere. This might be taken as indicating that the flame of the lamp or candle would be wholly extinguished when the oxygen was depleted $3\frac{1}{3}$ per cent.

REES H. BEDDOW,
Gallup, N. M. State Mine Inspector.

The Bellevue Mine Explosion Controversy

Referring to the request of J. W. Powell, COAL AGE, Feb. 8, p. 232, that the question as to the actual cause of the second Bellevue mine explosion be further discussed, I would suggest that Mr. Powell give the readers of COAL AGE his own theory accounting for the explosion. In doing this, I would suggest that he give particular attention to the following points:

1. Name the places in the mine where there was evidence of coking or cinderling of the dust, or of any abnormal heat.
2. State the place where, in his opinion, No. 2 explosion had its origin. The origin of this explosion, according to Messrs. Stirling and Cadman, was between the third and fourth cross-pitches above No. 73 chute.
3. State what evidence of firedamp, if any, was found at this point.
4. State if it is not a fact that the timber work at the foot of this chute was not blown away.
5. State if this is not proof positive that an explosion of firedamp did not originate at this point.
6. Explain why Mr. Stirling's evidence at the inquiry does not agree with the place mentioned in his paper as being the point of origin of the explosion.
7. State if the pillars were not intact between chutes Nos. 70 and 71 and were there not stoppings in all the crosscuts between these chutes, excepting the top crosscut.
8. State what pillars were being worked between chutes Nos. 71 and 88.
9. State if it is not a fact that no firedamp was found in the fourth cross-pitch between chutes Nos. 71 and 75 according to the examination by Bovio & Cardell, who made a special investigation of the old workings in this part of the mine, before the disaster occurred.
10. Explain the probable effect on the mine, if a body of firedamp such as that assumed by Messrs. Stirling, Heathcote and Cadman to have accumulated here had been ignited by sparks caused by a fall of roof.
11. Where, in your inspection of the mine, did you find the strongest indications of heat, after the second disaster.
12. State which of the high-pressure, air-charging stations were plugged up by your rescue party, and to what extent it was injured.
13. State in what condition you found chutes Nos. 52 and 53, as regards abnormal heat and débris, especially in the cross-pitches on the south side of the chutes.
14. State which chute or chutes were used for dumping and carrying the coal gotten at the south end of the fifth cross-pitch, to the main gangway; and describe the condition of this chute after the disaster.
15. State if you or any other person, to your knowledge, found any traces of flame or coking on the pillars between chutes Nos. 45 and 82.
16. State if Messrs. Stirling and Cadman do not eliminate coal dust from taking any part in the propagation of the flame, in this explosion.
17. State in what condition you found No. 5 cross-pitch, between chutes Nos. 45 and 61, and the main gangway between these points, after the second disaster.

If Mr. Powell will answer these questions in order, I will reply at as early a date as possible. I believe this will help to settle definitely any points at issue as to the real cause of the explosion.

JAMES ASHWORTH,
Mining Engineer.

Vancouver, B. C., Canada.

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Explanation

The following letter received from W. M. Thornton, in reference to his article, "Gas Ignition by Electric Sparks," COAL AGE, Vol. 2, pp. 685, 722 and 796, is self explanatory.

In reply to your letter of the 6th inst., in regard to the size of conductors used in my gas-ignition tests, I would say that the same size of conductor was used throughout; viz., iron, 0.075 in.; copper, 0.065 in.; nickel, 0.05 in., except where I have definitely specified otherwise.

You will probably notice some criticism from the chemists to the effect that small quantities of impurities in the gases would influence the result. This, in my opinion, is quite beside the mark; for the value of the results, as a general electrical survey of the ground covered, is not affected by a change of even a few per cent., in any of the constituents, before dilution with air. I have reason to believe that my analyses were well within that limit.

W. M. THORNTON,
Professor of Electrical Engineering, Armstrong College,
Newcastle-upon-Tyne, England.

INQUIRIES OF GENERAL INTEREST

Bending Stress in a Hoisting Rope

Please explain fully what is meant by bending stress, in reference to wire ropes; and state how this affects the safe working load. Will the use of a sheave of larger diameter reduce the bending stress, and how may the required diameter of a head sheave in hoisting be calculated?

MINING ENGINEER.

Pittsburgh, Penn.

The term bending stress, as its name implies, is the greatest stress produced in any of the fibers or wires of a rope, due to its being bent over a sheave or pulley. When a rope is bent over a sheave, the result is the same as in the bending of a loaded beam (Fig. 1). As in the beam the fibers are compressed on one side of a neutral

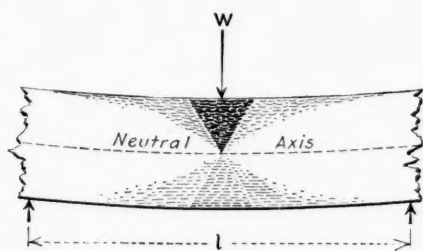


FIG. 1. SHOWING EFFECT OF BENDING ON THE FIBERS OF A HEAVILY LOADED BEAM

axis and extended on the other side of that axis, so when a rope is bent over a sheave some of the wires are compressed while the others are extended. The extension or compression is greatest in the outer fibers of the rope.

A rope is no stronger than its weakest fiber and, for this reason, the bending stress in a rope is always calculated for its ultimate fiber, which is at the outer surface or circumference of the rope. This stress in the outer fiber of the rope, caused by bending, is calculated from a basis of the modulus of elasticity, $E = 30,000,000$ lb. per sq.in., for steel.

The modulus of elasticity expresses the degree of elasticity of the material. For example, a certain force will produce a certain stretch or elongation in a rod of given material and cross-section. The force divided by the area of cross-section is the *unit force*; and the elongation divided by the length of the rod is the *unit elongation*. The modulus of elasticity E is the ratio of the unit force f , to the unit elongation l . Thus,

$$E = \frac{f}{l}; \text{ and } f = El$$

The bending stress must always be considered as a part of the working load and therefore decreases the net working load or the load hoisted. In the use of a sheave of too small diameter, the bending stress in the rope may often equal or even exceed the load hoisted. It is, therefore, of the utmost importance to calculate this stress and add it to the load hoisted, including friction, in order to find the total load on the rope. If this exceeds

the safe working load for the rope, a sheave of larger diameter should be used, so as to reduce the bending stress.

In the case of a rope bent over a sheave (Fig. 2), it can be shown that the elongation of the outer fiber of the rope per unit of length, or the unit elongation, is equal to the ratio of the diameter d of the rope, to the diameter



FIG. 2. DIAGRAM SHOWING ARC OF ROPE, NEUTRAL AXIS, RADIUS OF BENDING AND RADIUS OF ROPE

D of the sheave; or $l = \frac{d}{D}$; which gives for the unit bending stress

$$f = E \frac{d}{D}$$

An example will make this clear.

Let it be required to find the smallest diameter of sheave that will be required to hoist a load of 8 tons, including friction, from a shaft 400 ft. deep, using a factor of safety of five.

The first step is to find the diameter of a 6-strand, 19-wire, extra-strong cast-steel hoisting rope, which is calculated for this load, as follows:

$$d = \sqrt{\frac{5 \times 8 \times 2000}{39 \times 2000 - 5 (1.58 \times 400)}} = 1.03, \text{ say } 1 \text{ in.}$$

A 1-in. wire rope weighs 1.58 lb. per lineal foot, and the weight of the rope hanging in the shaft is, therefore, $1.58 \times 400 = 632$ lb. The total load on the rope at the beginning of the hoist, including friction, is then $8 \times 2000 + 632 = \text{say } 16,630$ lb., or 8.315 tons.

For a 6-strand, 19-wire, extra-strong cast-steel hoisting rope, the minimum diameter D of sheave, in inches, is found by dividing the cube of the diameter d of the rope in inches, by the load L on the rope in tons, and multiplying this result by 400, thus:

$$D = 400 \frac{d^3}{L} = \frac{400 \times 1^3}{8.315} = 48+, \text{ say } 50 \text{ in.}$$

The above formula is based on a value for the modulus of elasticity for steel, $E = 30,000,000$ lb. per sq.in.

EXAMINATION QUESTIONS

Pertaining to Hoisting

Ques.—What are the essential qualifications of a competent hoisting engineer at a coal mine?

Ans.—The hoisting engineer at a mine must be honest, sober and industrious. He must be prompt in the performance of his duties; observant of small details; quick to answer all signals and must exercise care and judgment in the handling of his engine. He must be intelligent, able to read, write and speak the English language; familiar with the theory of steam and the steam engine and have had sufficient experience to understand the care of boilers and the requirements of firing, to obtain the best results in the generation of steam. He must be able to detect anything wrong in the running of his engine and to make the necessary alterations and repairs.

Ques.—In ordinary coal-mining practice, what style of rope is best adapted to hoisting?

Ans.—A 6-strand, 19-wire, extra-strong cast-steel rope will generally give the best service. The 19-wire ropes (19 wires in each strand, making a total of $6 \times 19 = 114$ wires) are more pliable, because the wires are smaller and, for this reason, they are better adapted to hoisting than the 7-wire ropes (7 wires in a strand, making a total of $7 \times 6 = 42$ wires). For very deep hoisting, plow-steel ropes are often used, on account of their greater tensile strength.

Ques.—Find the diameter of an extra-strong cast-steel, 6-strand, 19-wire rope, for a safe working load of 10 tons.

Ans.—The breaking load of a 1-in., 6-strand, 19-wire, extra-strong cast-steel rope is 39 tons. In ordinary mining practice, it is customary to use a factor of safety of 5. Then, since the strength of ropes varies as the squares of their diameters, the required diameter of rope, for a working load of $L = 10$ tons, may be calculated as follows, using a factor of safety $f = 5$:

$$d = \sqrt{\frac{fL}{39}} = \sqrt{\frac{5 \times 10}{39}} = 1.13 \text{ in.}$$

Therefore, assuming a factor of safety of 5, an extra-strong, cast-steel, 6-strand, 19-wire hoisting rope, $1\frac{1}{8}$ in. in diameter, will have a safe working strength of 10 tons.

Ques.—Find the safe working load of a $\frac{3}{4}$ -in., extra-strong, cast-steel hoisting rope having 6 strands and 19 wires.

Ans.—Using the same factor of safety as in the previous question and reversing the formula, the safe working load, in this case is,

$$L = 39 \frac{d^2}{f} = \frac{39 \times 0.75^2}{5} = 4.38 \text{ tons}$$

Ques.—What load will be exerted to break the axle of a head sheave when the load on the hoisting rope is 10 tons, including friction; and the rope leading from the winding drum to the head sheave makes an angle of 50 deg. with the horizontal?

Ans.—In this case, the stress in each branch of the hoisting rope is 10 tons (20,000 lb.). If the shaft is vertical, the angle the rope will make in passing over the sheave, or the angle between the two branches of the rope, will be $90 - 50 = 40$ deg. Referring to the accompanying figure, the relation of the forces acting on

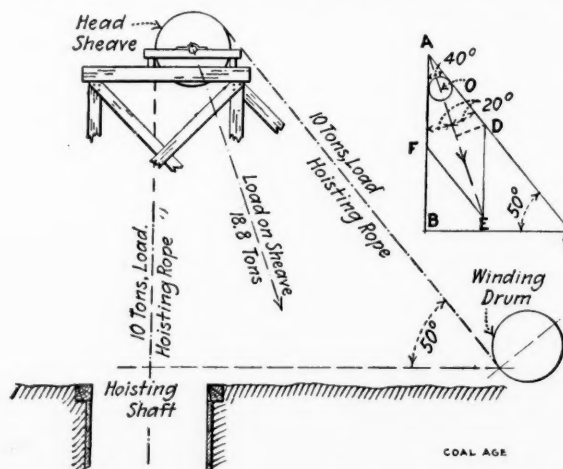


DIAGRAM SHOWING THE DIRECTION AND INTENSITY OF THE LOAD ON HEAD SHEAVE IN HOISTING

the sheave and the resulting load on the axle is clearly shown in the small diagram at the right. The center of the sheave being at O , the two branches of the rope are extended to meet at A , and the angle BAC is $90 - 50 = 40$ deg. The parallelogram of forces is represented by the figure, $ADEF$. Since the load on each branch of the rope is the same, $AD = AF$ and the sides of the parallelogram of forces are all equal. The diagonal AE represents the direction and intensity of the resulting load on the axle of the sheave. This load is calculated thus:

$$L = 2W \cos \frac{1}{2}(90^\circ - 50^\circ) = 2 \times 10 \cos 20^\circ = 20 \times 0.94 = 18.8 \text{ tons}$$

Ques.—Calculate the diameter of an extra-strong, cast-steel, 6-strand, 19-wire rope required for hoisting in a shaft 650 ft. deep. The mine cars weigh 1600 lb. and have a capacity of one ton, each; the weight of the cage is 2400 lb. Allow one-tenth of the total load hoisted, for friction.

Ans.—The load hoisted at one time is coal, 2000 lb.; car, 1600 lb.; cage, 2400 lb.; total, 6000 lb. Allowing one-tenth for friction, the load on the rope is $6000 + 600 = 6600$ lb. Using here a factor of safety of 6 and making allowance in the calculation for the weight of the rope hanging in the shaft, the depth of the shaft being 650 ft.; the required diameter of the rope for this load will be

$$d = \sqrt{\frac{6 \times 6600}{39 \times 2000 - 6(1.58 \times 650)}} = 0.74, \text{ say } \frac{3}{4} \text{ in.}$$

The constant 1.58 is the weight, in pounds per foot, of a 1-in. rope.

SOCIOLOGICAL DEPARTMENT

Safety the First Consideration

BY PETER WESTLEIGH*

SYNOPSIS—The United States Coal & Coke Co. has adopted the motto of the other subsidiaries of the United States Steel Corporation as its own and is doing its best to make the mines safe. The importance of having sufficient power in equipment to do the work demanded of it is emphasized as an item in mine safety.

“Safety the first consideration” is the slogan which has been adopted by the United States Coal & Coke Co. and other subsidiaries of the United States Steel Corporation. This company operates 12 mines around Gary, McDowell county, controls several thousand acres of coal lands and has an average daily output of 15,000 tons. All of the mines are easily reached from Gary, the most remote being No. 12, which is twelve miles from the

quired not only to conform to the state mining laws, but also, with the rules and regulations of this company which are more stringent and more exacting than the former. All their employees are urged to report the presence of any unusual danger which they may encounter, rather than begin work under threatening conditions; thus the number of serious injuries has been reduced to a minimum.

ILLUMINATED WARNING

At the entrance of each mine, there is placed a large sign, with conspicuous letters, illuminated at night.

THE PREVENTION OF ACCIDENTS AND
INJURIES BY ALL POSSIBLE
MEANS IS A PERSONAL DUTY
WHICH EVERYONE OWES
NOT TO HIMSELF ALONE, BUT
ALSO TO HIS FELLOW WORKMEN



THE VILLAGE OF GARY SEEN FROM THE “CAMEL’S BACK,” SHOWING CATHOLIC CHURCH, OFFICE AND CLUBHOUSE ON THE MIDDLE LEFT

town. At all the mines the cutting and shooting is done at night and the coal is loaded and hauled out during the day.

All the mines are drifts with the exception of mine No. 1, which is a shaft and No. 2, which is a slope. The coal seams vary in thickness from 4 ft. in No. 3, to 9 ft. in No. 12. The mines all receive their power from a central power house located in Gary, the power being transmitted by high-tension feeder lines supported in some places by steel towers and in others by wooden poles. At each of the mines is a substation, at which an electrician is constantly in charge and which is frequently visited and inspected by the chief electrician of the company, who also inspects, once each month or six weeks, the entire electrical equipment and any new wiring which may have been done in any part of the mine.

All employees in or about the various mines are re-

This sign is the last thing the miners see as they enter the mine, and it serves to remind them constantly that the care of their limbs and lives is important and not to be ignored.

The illustration of mine No. 7 shows how conspicuous these signs are and how continually they confront the miners. One is shown directly over the entrance of the mine, another on the side of the foreman’s office.

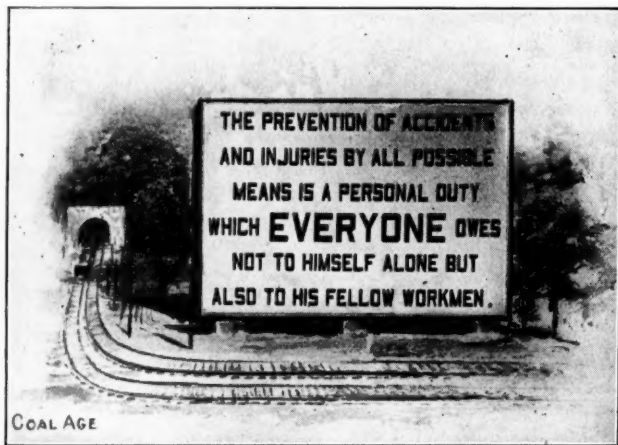
In the actual process of mining the precautions taken by this company are much more stringent than those required by the state mining laws. Crosscuts are driven at such intervals as are considered necessary, regardless of the lesser legal requirement, and the minimum ventilating current is 12,000 cu.ft. per min. in the last breakthrough of every pair of headings, whether working or not. The company requires that props be set within 6 ft. of the working face, although there are but few places where these props are actually necessary.

*Columbus, Ohio.

On all roads where more than one car is hauled at a time the haulageway is driven wide enough to allow 2½ ft. clearance on each side of the mine cars so that a trip may be passed in safety at any point. This applies to all parts of the mine with the exception of the rooms. On main haulage roads where large trips are hauled

battleships. This makes the frame absolutely indestructible, and insures the motorman against serious injuries which would ordinarily result from a collision with rolling stock or rib.

The capacity of the motors is such that the locomotives are able to haul heavy trips with great ease, which feature is especially valuable in view of the fact that it



THE MOTTO OF THE UNITED STATES COAL & COKE CO.,
AT GARY, W. VA.

"refuge holes" are provided in addition to the above. These are cut in the coal at stated intervals and kept whitewashed.

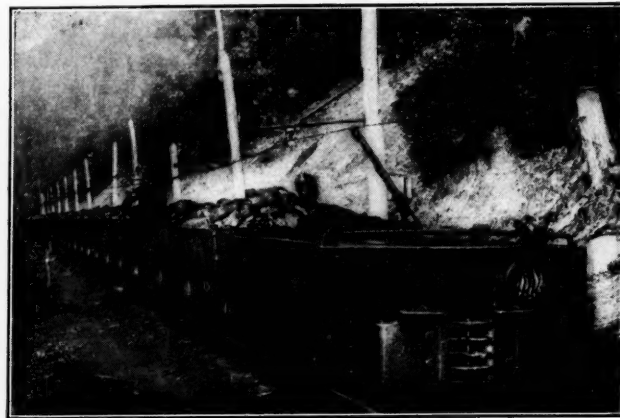
GOOD EQUIPMENT AND SAFETY

Every precaution is taken not only in the method of operation, but also in the selection of equipment which has been designed with safety as a prime factor, equipment that will not only give perfect service and afford the maximum output, but will also insure the workmen against the possibility of danger during the operation of the same.

The United States Coal & Coke Co. has adopted the 13-ton "Armorplate" type locomotive as standard haulage equipment, not only because it renders perfect service, but because safety was given careful consideration in its design and construction.

"Safety the first consideration" is also the slogan for the locomotive motorman, as may be seen in the accompanying illustration, showing the motto prominently displayed on the side frame. This legend is repeated on the other side.

Great, powerful locomotives they are, with a frame constructed of solid steel similar to the armorplate used on



13-TON ARMORPLATE MOTOR HAULING A 212-TON TRIP
UP A 1% GRADE

permits a schedule to be made for all haulage locomotives.

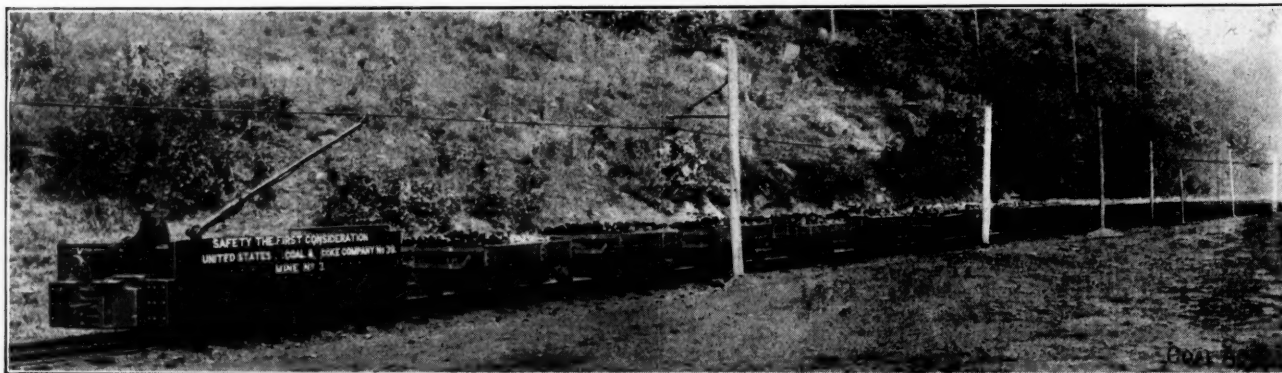
It is absolutely necessary that they should always be "on time," in order not only to insure the maximum output, but also to prevent personal injuries or serious damage to property, which might result as a failure to heed the importance of this fact. This requires locomotives with a record for reliable service.

The locomotives in operation at this company's mines not only have motors of unusual capacity, but are also designed to control heavy loads on steep grades. This feature itself has averted many accidents.

The power of "Armorplate" type locomotives is shown in the accompanying illustrations, which are reproduced from photographs taken at the mines of the above mentioned company. The illustration of a trip at mine No. 6, south of Gary, shows a 13-ton locomotive approaching the tippie and hauling up a 1 per cent. grade a trip aggregating 212 tons.

A CLEAN AND SANITARY TOWN

The headquarters of the United States Coal & Coke Co. is situated at Gary, McDowell County, on the Norfolk & Western R.R. The offices of the coal company, also their power house and machine shop are located



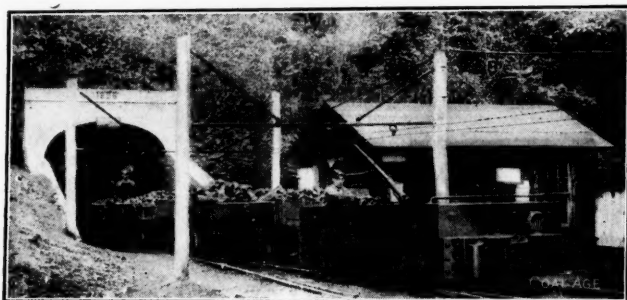
THE SIGN COUNSELING SAFETY DECORATES THE LOCOMOTIVE ON EACH SIDE PLATE. A TRIP AT NO. 3 MINE

there. All are stone buildings, tile roofed and as well constructed and modern throughout as one would find in any city.

The first impression one receives on entering the village is most favorable, as its appearance is far in advance of most mining towns. In fact, it reminds one of a quiet country town, so invisible are the coal mines from most parts of the village. In matter of years the town is as yet in its infancy, but marked improvements are already being made to insure sanitary conditions and nothing is left undone which will promote the health and comfort of its inhabitants, or add to the attractiveness of their homes.

The houses are better equipped than many of those occupied by mechanics in towns and cities. They are all fitted with electric lights and have water in the kitchens, as the company realizes the imposition which is often placed upon the female members of the family in mining communities in having to carry water for long distances and pump it from deep wells. This provision also promotes better sanitary conditions and more cleanliness among the people.

There is also a sanitary committee appointed for each plant, composed of the householders with the resident physician in charge, which makes regular examinations and reports on the sanitary condition of the houses and towns.



NO. 7 MINE, UNITED STATES COAL & COKE CO., WITH SIGNS ON DRIFT AND FOREMAN'S OFFICE

The houses are built not less than 50 ft. apart, and the yards are all fenced in, giving to each householder ample room for a yard and garden, and a premium at each plant is offered every year by the company to the householder who has the best kept vegetable garden and yard.

Schools and churches of every denomination are found at the plants, and there is now under course of erection at Gary a high-school building which will give parents an opportunity to educate their children at trifling expense.

The rapid advance so readily noticeable is entirely due to the policy of the management of the United States Steel Corporation. That company looks after the welfare of its employees and affords them every convenience possible. The president of the United States Coal & Coke Co., Thomas Lynch, is a man who has had a wide experience in the mining industry, having been in charge of the coal-producing plants of the Carnegie steel companies long before the United States Steel Corporation was formed, and it is entirely due to his untiring efforts that the company has made such rapid advance in the protection of its men from the dangers of the mine and in the development of comfortable villages for its many employees.

Southern Appalachian Coal Operators Association

SPECIAL CORRESPONDENCE

The annual meeting of the Southern Appalachian Coal Operators Association was held in Knoxville on Tuesday, Feb. 11. Those who continually harp on the alleged fact that coal men, and especially coal operators, cannot get together should have been present on this occasion. So successful was this meeting, that invited guests who have visited annual meetings of many societies, declared that this association surpassed all others in effective, coöperative work along all lines.

Starting three years ago with a few members who were determined to bring the operators together in a legitimate manner in order to place this field upon a business basis, they increased in numbers and coöperated under the leadership of the president, B. A. Morton, who has been president for these three years, until they developed a strong working body, which has accomplished much for the field.

Upon the refusal of President Morton to stand for reelection, E. C. Mahan, general manager of the sales department of the Southern Coal & Coke Co., was elected to that position. The following operators, all representative men from different districts in the field, make up the official list for 1913:

President, E. C. Mahan, Knoxville; first vice-president, J. L. Boyd, Knoxville; second vice-president, C. S. McManus, Knoxville and Middlesboro; secretary, James E. McCoy, Knoxville; executive board, C. M. Moore, Careyville, Tenn.; B. A. Morton, Knoxville; L. I. Coleman, Knoxville; J. B. Campbell, Atlanta, Ga.; T. I. Stephenson, Knoxville; H. M. La Follette, LaFollette, Tenn.; A. Gatliff, Williamsburg, Ky.; James R. Wooldridge, Wooldridge, Tenn.

There are now 80 companies in the association, representing from 80 to 90 per cent. of the tonnage of the field. The report of the secretary showed ample resources to meet all obligations with a handsome surplus on hand, and the financial outlook for 1913 equally bright.

The credit bureau, with a collection department, is much used and acts as a clearing house for credit inquiries and information. The newly elected president, E. C. Mahan, suggested that the association should also act as a clearing house for operating data and that an exchange for ideas and experience in economical operating should be established.

As a number of the large operations in southeastern Kentucky which are just getting into the producing class, produced practically no tonnage in 1912, they will add considerably to the income and importance of the association during the coming year. A traffic bureau, with an expert rate man in charge, is a new feature added during 1912 and it has already shown its value.

A campaign of publicity to create public sentiment in favor of the state abolishing its mine in which convicts are employed, and the placing of them on the roads, is being successfully waged, and it is hoped that some relief will be secured during the legislative session of this year.

A banquet was held at the Hotel Colonial in the evening with James R. Wooldridge as toastmaster. Walter H. Finley spoke on "Scientific Management," and emphasized the point that the human element should be given as careful consideration as the most costly machinery. W. C. Tucker, general manager of the Wisconsin Steel Co., with coal and coke operations at Benham, Ky., spoke on "The Relation of Welfare Work to Production."

C. J. Norwood, chief mine inspector of Kentucky, made "Some Observations Touching Accidents in Coal Mines." J. F. Callbraith, secretary of the American Mining Congress, pleaded for some legislation permitting the operators to combine and arrange prices in a legitimate manner so as to obtain a fair price and profit from their product.

About one hundred and twenty-five members sat down to the banquet table and nearly all were the highest executives in the different departments of their companies.

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Firedamp may be given out from freshly-cut coal, from cracks or fissures in the roof, from the gob or waste, from blowers either in the seam itself or in the strata. In gaseous seams it often escapes with a singing noise and a cracking of the coal. On wet faces small bubbles are often formed by the escaping gas. The presence of firedamp depends in a great measure upon the character of the roof. A soft roof will pack tightly, while a hard roof does not pack so tight, but leaves plenty of space for the collection of gas. Diluted firedamp can be breathed, and nothing less than a 50 per cent. mixture will affect respiration seriously.

COAL AND COKE NEWS

Washington, D. C.

Developments during the past week indicate that the Federal Government has no intention of abandoning its attack upon the anthracite coal combination, but that it has decided to adopt a new method. As a result of application made by counsel for the Government, the United States Court at Philadelphia, on Feb. 19, dismissed the suit of the Federal Government against the Philadelphia & Reading R.R. Co., in which it was charged that the company was violating the "commodities clause" of the railway rate law.

The Government claimed that the railroad company was violating that section of the law which forbids a line from transporting commodities in which the company has an interest and sought an injunction restraining the road from transporting coal dug from its own mines. In this connection it named as a codefendant the interests allied to the railroad company. The order dismissing the case states that the action taken is without prejudice and will not prevent the Government from bringing another action on the same line.

This dismissal, it is understood, was secured for the purpose of clearing the way for consideration of the position of the road, both under the Sherman law and under the commodities clause of the railroad law. This is the next step in the policy which seems to have been initiated by the civil suit filed a few days ago at Trenton, and charging the Lackawanna R.R. and the Lackawanna Coal Co. with violations both of the Sherman law and the commodities clause. There is no official statement as yet as to how far this policy is likely to be carried.

Bureau of Mines Appropriations

In the Sundry Civil Bill, just reported to the House of Representatives by the Appropriations Committee, the following appropriations are made for the Bureau of Mines for the coming year:

For the general expenses of the Bureau of Mines, including the pay of the director and the necessary assistants, clerks and other employees in the office at Washington, D. C., and in the field, and for every other expense requisite for and incident to the general work of the Bureau of Mines in Washington, D. C., and in the field, to be expended under the direction of the Secretary of the Interior, \$70,000.

For the investigation as to the causes of mine explosions, methods of mining, especially in relation to the safety of miners, the appliances best adapted to prevent accidents, the possible improvement of conditions under which mining operations are carried on, the use of explosives and electricity, the prevention of accidents, and other inquiries and technologic investigations pertinent to the mining industry, \$347,000.

For the analyzing and testing of the coals, lignites, ores, and other mineral fuel substances belonging to or for the use of the United States, including personal services in the Bureau of Mines at Washington, D. C., not in excess of the number and total compensation of those so employed during the fiscal year nineteen hundred and twelve, \$135,000.

For inquiries and investigations into the mining and treatment of ores and other mineral substances, with special reference to safety and waste, \$100,000: Provided, that no part thereof may be used for investigation in behalf of any private party, nor shall any part thereof be used for work authorized or required by law to be done by any other branch of the public service.

For one mine inspector for duty in Alaska, \$3000.

For per diem, subject to such rules and regulations as the Secretary of the Interior may prescribe, in lieu of subsistence at a rate not exceeding \$5 per day when absent on official business from his designated headquarters, and for actual necessary traveling expenses of said inspector, \$3500.

For technical and scientific books and publications and books of reference, including payment in advance for subscriptions to publications, \$1500.

For the purchase or lease of the necessary land, where and under such conditions as the Secretary of the Interior may direct, for the headquarters of five mine-rescue cars and for the construction of the necessary railway sidings on the same, \$2000: Provided, that the Secretary of the Interior is hereby authorized to accept any suitable land or lands that may be donated for said purpose.

In all, for the Bureau of Mines, \$662,000.

Concerning the Corporation Tax

After careful inquiry Commissioner of Internal Revenue Cabell has issued the following statement as to the corporation tax:

"There have been several inquiries as to the application of the regulations relative to an allowance for an unearned increment in the ascertainment of net income of mining corporations for the special excise tax on corporations, which indicate that the true intent of the regulations is not understood. The fact has also developed that many corporations, in their

attempt to apply the regulations, begin with a current unit valuation of the product concerned instead of the en bloc value as of Jan. 1, 1909, as is required. The manner of entering the ascertained valuation as of record has also been neglected and misunderstood.

In order to make the requirements of this office plainer and to assist corporations in arriving at valuations which shall not be speculative in character nor founded upon the future profits and earnings of the corporations which should belong to the period during which they are earned, and in order that no portion of income which really belongs to any particular year shall be ascribed to or allotted as the earnings of previous years, items Nos. 99, 100, 101 and 103 of T. D. No. 1742 are modified so as to read as follows:

"No. 99. The note is amended so that it shall read:

"Values, as aforesaid, should not be estimated on the basis of the assumed salable value of the output under current operative conditions, less the actual cost of production, because, as hereinbefore stated, the selling price, under such conditions comprehends a profit both for carrying the investment in coals, etc., improvements and working capital, and for conducting operations in respect of production and disposal of product. The value to be determined as stated must be en bloc of the entire deposit of minerals and mineralized property owned, exclusive of improvements and development work, if the same were disposed of in that form."

"No. 100 is amended to read:

"The unit value as of Jan. 1, 1909, ascertained as above outlined, would indicate the value to be attached to that date to the capital assets disposed of during any calendar year succeeding. The amount claimed as a deduction from gross income on account of unearned increment shall be shown separately in the deductions from gross income in the return of annual net income."

"No. 101 is amended to read:

"The precise detailed manner in which the estimate of value of minerals, etc., as at Jan. 1, 1909, shall be formed, must naturally be determined by each corporation interested. Every corporation claiming and making a deduction for unearned increment as provided in section 100 preceding, shall maintain an official book record of the properties owned by it in connection with which unearned increment is claimed, and which record shall show the general ledger or general balance sheet value thereof, together with the estimated amount of appreciated value in such properties in excess of general balance sheet values, as of Jan. 1, 1909, together with all evidence and information on basis of which such appreciated value was formed. This estimate must be formed on the lines and basis indicated in the 'note,' Section 99, namely, the salable value of the entire deposit considered en bloc. This record should also present clearly and fully the transactions during each year in respect of quantities of minerals disposed of and for which deductions are made, respectively, for depreciation and unearned increment, together with the amount thereof. No deduction for unearned increment will be allowed unless the aforesaid record is kept, nor unless the evidence as to the estimates of quantity of minerals in deposit and the valuation thereof are accepted by the department. Values determined and recorded as of Jan. 1, 1909, as aforesaid, should be used in the compilation of all subsequent years' excise tax returns."

"In case it subsequently develops the property possesses a greater quantity of mineral, etc., reserve than was in the aggregate estimated as of Jan. 1, 1909, only such an amount of aggregate value can be assigned to such excess mineral tonnage as of Jan. 1, 1909, as it was at said date estimated by the company attached to the property and was not assigned by it, as hereinbefore provided, to the specified tonnage in the property."

"No. 103 is amended to read:

"As the amount to be deducted for depletion of deposits (Regulation No. 101) is to be formed on basis of the estimated reserve of minerals, etc., it follows that if it develops such estimate is understated, the cost investment and estimated unearned increment in the capital asset may be wholly extinguished before all mineral reserves are removed. When this is reached, further deductions for exhaustion of minerals should be discontinued."

"Collectors of internal revenue will make requisition for the necessary number of these amendments and furnish a copy to each corporation interested."

PENNSYLVANIA

Anthracite

Ashland—The Scranton Coal Co. has reported to the Pennsylvania Mine Code Commission that they will allow one-half the value of the property under \$3000 if damaged by mine caves. On all properties valued at more than \$3000, they will allow half valuation or agree to sell underlying coal subject to royalty agreement.

Archbald—The White Oak colliery of the Delaware & Hudson Co., which resumed operations Feb. 10, after an idleness of eight days, due to a strike, was forced to close down again owing to the burning of the fan house. The company officials arranged to replace the damaged machinery, and an effort was made to operate part of the colliery the following day. There are 800 men and boys employed in the plant. It is supposed that the cause of the fire was a hot journal.

Wilkes-Barre—President White of the United Mine Workers is trying his hand in the anthracite region to stamp out

the petty strike habit. Mr. White says that there has been a tendency to over-step the agreement in the anthracite field by declaring petty strikes. He further states the welfare of the miner's organization depends upon standing firmly by their agreements.

While eight men were being lowered to work in the Alden shaft of the Susquehanna Coal Co., Feb. 13, the drawhead on the mine carriage pulled out and the cage dropped a distance of 200 ft. before the safety devices worked.

The annual summer meeting of the Coal Mining Institute of America will be held in Wilkes-Barre on June 17, 18 and 19. This will mean a gathering of several hundred coal operators, inspectors, engineers, and superintendents from all the soft-coal states, as well as the local men allied with the coal interests. This is the 56th semi-annual meeting of the institute.

Easton—Officials of the Lehigh Valley Coal Co. are canvassing their employees at Mahanoy City for sentiment on a proposition to pay \$75 to the widow or dependent of victims of a mine accident, provided the remainder of the men agree to work on the days of funerals.

Bituminous

Mt. Pleasant—Differences between the Brush Run Coal & Coke Co. and their employees have been adjusted and the 40 men who have been idle several days have returned to work. It appears that the men had difficulty with a certain boss whom the company has discharged after a careful investigation of the matter.

Connellsville—Secretary T. B. Dilts, of the State Y. M. C. A. Mining Department, has opened a new Y. M. C. A. building in the mining town of Jerome.

The United Coal Co. has erected the building, a modern two-story structure, 24x100 ft., and has equipped it with bowling alleys, reading rooms and class rooms.

Arendale—The plant of the Pennsylvania Coal & Coke Corporation at mine No. 41 has been destroyed by fire, entailing a total loss of about \$25,000 and throwing 120 men out of work. The company had been making extensive improvements at the plant and intended to abandon that part which the fire destroyed. A new power house, boiler house, and motor barn of brick construction will be completed within a short time.

Pittsburgh—In the recent convention of District No. 5 of the United Mine Workers in the Labor Temple a sympathetic strike of the miners in western Pennsylvania to aid the strikers in West Virginia was urged strongly. The proposal was finally defeated after a stirring debate.

Du Bois—The miners of this region are planning to aid, in a financial way, the strikers of West Virginia fields. Local No. 2722 has decided to assess its members \$1 each as a starter for its fund. It is said that \$3000 will be sent to the strike zone within the next few weeks.

WEST VIRGINIA

Charleston—Delegate W. W. Wertz has succeeded in forcing his anti-mine guard bill through the house in the face of strong opposition. This measure prohibits the sheriff of any county from appointing deputies to act as mine guards in the pay of private corporations. The measure was carried by a vote of 45 to 31.

It is expected that the Illinois mine workers, in their annual state meeting, will ask President Taft to intervene in the long drawn-out strike in the West Virginia field.

Elk Ridge—A coal tippie of the M. B. Coal Co. was destroyed by fire, Feb. 18, causing a \$40,000 loss. There appears to be some doubt about the origin of the fire. The incident at Elk Ridge is the first serious trouble under the present proclamation of martial law.

Military authorities in Paint Creek Junction have announced that, of the 128 prisoners arrested in the strike zone recently, 50 have been released.

ALABAMA

Birmingham—In the effort to enforce the state mining law during the past year, 108 arrests have been made at the instance of the state mine inspector. Certificates of five mine officials have been revoked by the state mining board and certificates of three mine officials are being held, pending the action of the State Board of Examiners.

KENTUCKY

Louisville—An interesting tentative program has been arranged by Prof. H. D. Easton for the annual meeting at Lexington of the Kentucky Mining Institute on May 15, 16 and 17. The first-aid competitions between teams from various mines, which will be one of the most interesting features of the meeting, will probably be held on the first day of the meeting. The second is to be given over to the formal program,

and the third to discussions on various questions by mining experts.

OHIO

Bridgeport—The miners employed at the Lansing mine of the Lorain Coal & Dock Co., are on strike because the blacksmith has been discharged. Four hundred men are employed at the mine.

Gallipolis—Three barges of coal belonging to the Campbells Creek Coal Co. were sunk Feb. 13, when the tug boat, Robert T. Gillehan, collided with the cofferdam. Rivermen pronounce the new cofferdam a menace to navigation.

INDIANA

Indianapolis—The shotfirers bill has been passed by the Indiana House by a vote of 84 to 3, and now goes to the Senate. The miners have been trying to get such a bill through for six years. It provides that the shotfirers shall be employed by the operators. The bill provides that the law shall become operative in April, 1914, so that the parties to the next two-year contract between operators and miners, will have full notice of the proposed new law. Under the present shotfirers law, the miners pay the firers, as their appointment is made for the miners' convenience.

Terre Haute—Five hundred cars of coal have been under an embargo on the Big Four road. A complaint was made to the Indiana Railroad Commission and an order was issued for officials of the operating department of the road to appear before the commission and explain why the road had refused to remove the coal. At the offices of the railroad company it is said that the entire tonnage will be removed as soon as possible.

ILLINOIS

Chicago—The Chicago and Northwestern Ry. has awarded a trophy to the rescue team at its mines at Gillespie. This team made the best showing in a contest held recently by the company. The contest is open to all first-aid workers in the state and the winners are declared the champion team of the state of Illinois. Similar contests in the interest of first aid are held by the Superior Coal Co.

Eldorado—Five men were buried by a cave-in caused by an explosion in the Seagraves mine, Feb. 20. Three others were hurt.

Canton—Operations in the mine of the Norris Coal Co. have not yet been resumed, due to the fact that State Mine Inspector Taylor has not completed his investigations to his satisfaction since the time he ordered the mine to be shut down.

MICHIGAN

Grand Rapids—This city is to sell coal at \$7.50 per ton to its people. This will afford a saving of \$1.60 a ton to the citizens from the price charged by local dealers.

Battle Creek—A rich seam of coal is supposed to be located under a considerable portion of the city and men are attempting to get options on property, beneath which they believe the coal is located. An analysis of this coal has shown it to be of good quality.

KANSAS

Pittsburg—There has been a strike rumor flying over the district for several days to the effect that there is a threatened strike among the coal miners of Cherokee County. It is claimed by those in a position to know that the report is without foundation.

CALIFORNIA

San Francisco—Eight indictments charging criminal conspiracy to defraud the U. S. Government were returned yesterday by a Federal Grand Jury against eight officers and employees of the Western Fuel Co. The investigation disclosed an alleged conspiracy whereby the Government was defrauded out of \$450,000 or more in drawing back payments on imported coal resold by the company for use outside the United States.

FOREIGN NEWS

Winnipeg, Can.—It is reported that 72 men have been killed at the Siwash Peak mines at Yale, B. C.

Berlin, Germany—Four miners were killed by an accident Feb. 15 in the Wieche colliery, near Mulheim, in the Westphalian coalfield.

Vancouver, Can.—The refusal of the Britannia Mining & Smelting Co. to recognize the Western Federation of Miners has resulted in a walk-out in the company's mines. The company employs about 6000 men.

PERSONALS

James F. Thompson, until recently division superintendent of the Colorado Fuel & Iron Co., has been appointed superintendent of the coal mining operations for the Cerrillos Coal Co. at Madrid, N. M.

W. H. Webster has been appointed new traveling coke agent for the Baltimore & Ohio in the Connellsville region, with headquarters at Uniontown. H. C. Tucker, the former representative, has been transferred to Cleveland.

Godwin H. Powel, of Penrallt, Weston-Super-Mare, England, managing director of the Mount Carbon Co., Ltd., arrived in New York on Feb. 18, and is spending the time between the 21st and 27th at the company's operations at Powellton, Fayette County, W. Va. Mr. Powel will sail again for England on Mar. 1.

OBITUARY

William E. Cassidy, aged 54, vice-president of the Cassidy Coal Co. and the Bell-Jellico Coal Co., of Lexington, Ky., died recently at his home in that city from a paralytic stroke sustained ten days before his death. Mr. Cassidy had been engaged in the coal business in Lexington for about 16 years. His wife, who has been seriously ill for about a year, survives him, as well as a daughter and a brother, T. D. Cassidy, of Lexington.

PUBLICATIONS RECEIVED

Goulds Rotary Pumps. Bulletin No. 113. Published by the Goulds Mfg. Co., Seneca Falls, N. Y. The bulletin describes the characteristic features of construction and operation of the Goulds rotary pump. 16 pp.; 7 $\frac{3}{4}$ x10 in.; ill.

Eighth Biennial Report of the State Mine Inspector of the State of Utah, 1911-1912. 170 pp.; 6x9 in.; ill.

Lightning Arresters. The Electric Service Supplies Co., Philadelphia, Chicago and New York, has issued its 1913 edition of catalog of the Garton-Daniels lightning arresters and other lightning protective apparatus.

In this book is given much information relative to lightning phenomena, installation of lightning arresters, grounding, distribution, inspection and other allied subjects.

Its pages illustrate and describe the complete line of Garton-Daniels lightning arresters, a new line of panel-board lightning arresters cataloged for the first time by this company, high- and low-voltage choke coils and disconnecting switches, grounding apparatus, etc.

The last eight pages of this catalog are given over to installation diagrams, through which it is possible at a glance not only to learn the proper method for installing lightning arresters on any circuit, either d.c., a.c. or arc, but also to select exactly the type of arrester which is best suited for the protection of any class of circuit.

The catalog as a whole is well gotten up, intensely interesting, beautifully illustrated and printed, and is a book which every electrical man should have.

CONSTRUCTION NEWS

Kansas City, Mo.—An English syndicate is to begin at once to develop the Christy coal tract in the Waverly-Lexington field.

Morgantown, W. Va.—Three large steel companies are interested in coal in Greene County and extensive developments are expected during the early spring. The Crucible Co. has already begun the operation of its 8 holdings.

Salt Lake City, Utah.—Within the next year the Utah Ry. Co., which is building a line between Provo and Mohrland will expend more than \$1,500,000 for coal cars. The company is now considering the initial purchase of 500 of these cars at a cost of \$500,000.

Pottsville, Penn.—The Philadelphia & Reading Coal & Iron Co. has installed steam heating apparatus at the several bottoms and at each of the shanties of the Locust Gap

colliery, where the miners congregate at the end of their day's work, while waiting to be hoisted to the surface.

Harlan, Ky.—A new road is being built in Harlan County, Ky., extending from Harlan several miles up Martin's Fork to the Hall and other large coal holdings, which are among the richest in the county. The right-of-way has been secured, and grading will begin as soon as spring opens.

Baltimore, Md.—The Baltimore & Ohio R.R. Co. has under construction a third track between Rockwood and Garrett, Penn., on the Connellsville division of the road. The completion of this track will give the road additional facilities for the movement of its coal traffic out of the Somerset regions.

Charleston, S. C.—The directors of the Carolina, Clinchfield & Ohio R.R. have approved plans for the construction of modern coal piers at Charleston. The work will be started as soon as the bids have been passed on and it is expected that coal will be shipped from the piers by the end of the year.

Philadelphia, Penn.—The Philadelphia & Reading R.R. Co. is constructing a new coal pier at Port Richmond on the site of old pier No. 18. It will be 765 ft. long by 70 ft. wide, and of concrete construction. It is estimated that the work will be completed and the pier in operation some time during the summer or early fall.

Lexington, Ky.—The Lexington & Eastern R.R. proposes immediately to begin the construction of a 4-mile branch up Yount's Fork, of Boone Creek, in Letcher County, in order to tap the extensive holdings of the Mineral Development Co., a Philadelphia corporation. The branch will be rushed to completion as rapidly as possible.

Martin's Ferry, Ohio.—Work is progressing rapidly at the new mine of the George M. Jones Co. at Wegee. The main shaft has been sunk and work is being done on the archways of cement. The shaft will also be of concrete. A temporary wooden tippie will be constructed so that there will be no delay while the material for the steel structure is on the way.

Martin's Ferry, Ohio.—The Rail & River Coal Co. is planning extensive improvements in all its properties which will involve an expenditure of \$250,000. A new steel tippie is to be built at No. 3 mine, which will more than double the output. Power will be supplied to all openings by a central station. The improvements also include the erection of 100 houses.

Livingston, Ky.—A railroad some 30 miles in length is projected between Livingston and McKee, by the owners of coal lands in Rockcastle and Jackson Counties, in order to open up their properties to development and connect with the Louisville & Nashville at Livingston. The road has been incorporated with a capital stock of \$10,000 under the name of the Rockcastle R.R. Co.

Fairmont, W. Va.—The Mineral Fuel Co. has purchased between 4500 and 5000 acres of coal land in Letcher County, Kentucky and is planning an expenditure of approximately \$700,000 for opening mines, constructing plants, installing machinery, building houses, etc. The annual output is to be 750,000 tons. The property was purchased from the Mineral Development Co., of Philadelphia.

Fosterburg, Ill.—The Clark Bros. syndicate, of Philadelphia, is projecting a railroad from here to Alton, and contemplating the sinking of several mines here to furnish coal for the several electric lines that they control. They have organized the East Side Coal & Mining Co. as the operating end, and have bought a site for a power house in Alton at a cost of \$25,000. The coal land in this vicinity has never been worked, on account of lack of transportation facilities.

NEW INCORPORATIONS

Cleveland, Ohio.—The Cleveland Western Coal Co.; capital stock, \$250,000; to mine and deal in coal.

Connellsville, Penn.—The Stanton Georges Creek Coal Co.; capital stock, \$50,000; to mine coal near Frostburg, Md.

Spokane, Wash.—The Peerless Roundup Coal Co.; capital stock, \$500,000. Incorporators, L. G. Nash, M. J. Tait, et al.

Memphis, Tenn.—The National Coal Saving Co.; capital stock, \$10,000. Incorporators, S. L. Cockroft, Henry Burkard, W. D. Beam, G. E. Petty and J. W. Wyatt.

Los Angeles, Calif.—Los Robles Land & Fuel Co.; capital stock, \$100,000. Incorporators, E. G. Tilton, G. A. Nehrhood, E. F. Staples, J. O. Horton and C. E. Joslin.

E. Taplin, C. F. Taplin, C. N. Fiscus, W. S. Lister and A. C. Wald.

Morgantown, W. Va.—The Morgan Run Coal & Coke Co.; capital stock, \$50,000; to carry on a general mining and coke manufacturing business in the Kingwood district. Incorporators, A. L. Foster, C. W. Zinn, N. C. Steel, A. J. Arnett and J. E. Hamilton.

INDUSTRIAL NEWS

Minonk, Ill.—Webber & Sutton have recently purchased a 120-kw. generator for their coal mine at this place.

Emlenton, Penn.—A \$1,000,000 coal deal involving 10,000 acres of high-grade fuel in Somerset County is being closed by the Penn-Quemahoning Coal Co.

Collinsville, Penn.—In the Windber field, during the past year, the Berwind-White Co. has had an output of 4,000,000 tons. Fourteen mines are in operation.

Pittsburgh, Penn.—Ten thousand two hundred and six acres of mineral land in Clearfield County have been sold by A. R. Balcom, of Philadelphia, to the Star Portland Cement Co. for approximately \$1,000,000.

Tamaqua, Penn.—The Lehigh Coal & Navigation Co. has made a record output for the month of January, in Panther Creek colliery. The figures reached 330,000 tons, the largest for any single month in the history of the company.

Brazil, Ind.—On account of the poor market for domestic block coal, the Plymouth mine No. 1, of the Coal Bluff Mining Co., northwest of this city, has been closed until next fall. The mild winter has caused a big slump in coal markets.

Connellsville, Penn.—The Buffalo, Rochester & Pittsburgh Ry. has under option about 11,000 acres of coal land belonging to the New York Central. It is predicted that the railway will double-track its Indiana branch in the near future.

Washington, Penn.—It is reported that representatives of some of the big coal companies are trying to take out options on the Pittsburgh seam underlying a few farms near Old Concord. It is said that they are offering about \$200 per acre.

Duquoin, Ill.—As a result of the general depression of the coal business a number of the largest mines in southern Illinois have suspended operations indefinitely. Two of the largest mines are the Big Muddy and Chicago and Carterville companies.

Connellsville, Penn.—Announcement has been made of the sale of 206 acres of coal underlying the farm of J. M. Clark, in Jefferson Township, to the Washington Coal & Coke Co., for \$412,000. The coal will be operated by the purchasing company from the Star Junction plant.

Pineville, Ky.—Judge M. J. Moss and others have procured a lease on 1800 acres of coal land in the Harlan field and plan to begin development work at once. The land is owned by Judge W. F. Hall and lies on Martin's Fork. A 6-ft. seam of coal is to be opened at this time.

McAllister, Okla.—An application has been filed in the Supreme Court requesting the appointment of a receiver for the Choctaw, Newcastle & Western R.R., a small coal road in this section. The petition charges mismanagement and enumerates an alleged indebtedness of about \$9000.

Fairmont, W. Va.—The Consolidation Coal Co. has issued its report showing its earnings from all sources for the year, 1912, to be \$13,887,410, or an increase of nearly two and one-half million over the preceding year. The surplus for the year was about 10 per cent. of the full capital stock.

Pottsville, Penn.—The St. Clair Coal Co. has purchased a considerable amount of machinery used by the Nolan Bros. in their stripping contract at this place. The coal company will use the material in its own operations. The machinery purchase consists of a steam shovel and a number of locomotives.

Clinton, Ind.—It is reported that the Clinton Coal Co. is using compressed air to pump water from the flooded Crown Hill mine No. 1, west of Clinton. This is said to be the first time the system has been used in the Indiana coalfield. An electric pump hooked up to a 3-in. pipe had failed to reduce the water.

Glenrock, Wyo.—The Fairview Coal Co., which has been operating its mine at this place for the past two years, has recently put in a side track and is now preparing to increase its daily output. The old mines, which have lain idle for several years, have also taken on a new life and one is being operated on a small scale.

Pittsburgh, Penn.—It is reported that the Pennsylvania R.R. is contemplating the extension of its road from Marianna almost directly west to Hackney Station, and to Wheeling, W. Va. This will mean a new and quicker route of transportation from Wheeling to Pittsburgh, than that possessed by the Baltimore & Ohio, its chief competitor.

Whitesburg, Ky.—The Consolidation Coal Co. is now shipping from 20 to 30 cars of coal out from McRoberts per day, an average of from 140 to 175 cars per week. This output will, however, be increased, and it is said that by March 1 they will be shipping about 200 cars per week. They are now shipping more than 500 cars per week from their Jenkins mines.

Shamokin, Penn.—The local engineering department of the Philadelphia & Reading Coal & Iron Co. completed plans today for the sinking of a large new shaft at the Stirling colliery. The new opening will pierce several rich beds of anthracite coal, heretofore untouched or only partly worked. Arrangements were also made to sink a slope at North Franklin colliery.

Jasper, Ala.—The work on the big coal mine, owned by the Jagger Coal Co., is being pushed rapidly and it is expected that the mine will be in operation by the middle of the summer. The mine operates three seams, and each is said to range from 4 to 5 ft. of thickness. The coal is pronounced to be the best grade of steam and domestic coal found in the country.

Ironton, Ohio.—The Semet-Solvay Co., of Syracuse, N. Y., is said to be negotiating with the furnace interests of Ironton for the construction of a byproduct coke plant at that place to supply coke in the immediate vicinity. The same interests are now building a plant at Ashland, Ky. It is reported that about \$1,000,000 will be involved in the new plant and about 100 byproduct ovens would be included.

Lexington, Ky.—Representatives of 18 bituminous mines in western Kentucky are at Wilmington, Del., in conference with General T. Coleman DuPont, president of the DuPont Powder Co., relative to the consolidation of his large coal interests in that field with their company into one corporation, which will practically control all the large mine properties in that part of the state. The new corporation, if formed will have a capital stock of \$15,000,000.

Connellsville, Penn.—Owners of a tract of 6000 acres of coal land lying between Stoyestown and Shanksville have been notified that options which were taken out about three months ago will be listed soon, and that the money, \$50 an acre, will be received by the owners within a week. The company making the purchase is not known. The consummation of this deal will mean a transfer of about \$300,000. With the exception of a few small mines, the tract of 6000 acres has not been opened; consequently, there is some speculation as to the point from which operations are to be commenced.

Buffalo, N. Y.—The educational force of the Lehigh Valley R.R. Co. has been teaching its firemen how to fire their engines economically. In the face of the fact that the road is running larger and heavier trains than it was a year ago, and that many new firemen were employed in the latter months of 1912, the consumption of coal per ton mile has decreased. In addition to the work of the road foreman of engines, who has the general supervision of this important task, expert firemen are assigned to train the new men and teach them how to economize in the use of coal.

The actual results secured during the last six months of the year 1912, show a net decrease of 5 per cent. In the amount of coal used per ton-mile as compared with the same period of the previous year.

Reading, Penn.—It is said that much money will be spent by coal companies in developing new operations in the Schuylkill district of the anthracite region in 1913.

The prosperous state of the anthracite coal market is inviting the investment of unprecedented amounts of capital in the business. The Philadelphia & Reading Coal & Iron Co., the Lehigh Valley Coal Co., the Lehigh Coal & Navigation Co. and the Pennsylvania Coal Co. are the leaders in developing new fields, but the independent firms are also taking an important part in the work, a feature of which will be the reopening of many collieries whose operation was abandoned as unprofitable.

The Madeira Hill Co. is spending \$3,000,000 in opening up new collieries and remodeling old ones. It is suspected that within a year or two they will increase their shipments four fold.

Seranton, Penn.—The old Orangeville mine near Bloomsburg, which has been idle since the civil war, has been reopened and preparations are being made for taking out the coal.

COAL TRADE REVIEWS

GENERAL REVIEW

There is an abundance of individual hard coal being offered at prices well down to the regular Apr. 1 circular and only small tonnages are being placed. Even stove, which was in such heavy demand a short time ago, is now readily obtainable in carload lots. Consumers are keeping their requisitions down to a minimum in order to avoid having any surpluses when the April reduction goes into effect. Orders will gradually contract through the current month, to such an extent, as to force some curtailment in production at the mines.

Bituminous is in good supply, with orders scarce and operators unwilling to make sufficient concessions to move any considerable volume of coal. In the Coastwise trade, contracting is still being confined to inland business, few contracts being closed for water delivery, particularly among the larger consumers. If the high water-freights out of Hampton Roads continue in effect, the Pennsylvania grades all-rail will begin to supersede the West Virginia product at a number of the coastwise points.

The uncertain weather conditions have been such that they would cause a break in the stiffest market. Shipments generally are confined entirely to contracts, although to the north, in Canada, a comparatively heavy local demand has developed, which has tended to steady prices. The railroad movement in that section has also been quite slow and uncertain which has aided the situation materially and is the principal reason for the prices holding so well. There is considerable hesitation over new contracts; consumers are not offering to close and operators are affirming that prices are too low.

There is a fairly good retail demand in the Pittsburgh district, but contract consumers are showing a disposition to hold off because of the prevailing high prices. The trade in Ohio shows little if any improvement. The movement is being seriously restricted, in some instances, and Toledo is badly congested with coal. Ohio operators are eagerly looking forward to the opening of the lake shipping in anticipation of a heavy business the coming season. The Hampton Roads market continues to show a downward tendency and holders of speculative tonnages are in a difficult position. There has been a heavy dumping at the piers, but shipments are mostly on contracts, the demand for spot coal being light.

In the Middlewestern markets, prices were being freely cut in all directions when a drop of temperature and a heavy snowstorm occurred which steadied up the situation materially. The unfavorable conditions in this market were a result of over shipments on speculation and a heavy over-production.

BOSTON, MASS.

Bituminous is in plentiful supply at all the terminals and orders are scarce. The spot market is lifeless, and the concessions made are not sufficient to move any volume of coal. Contract business has so far been confined for the most part to inland consumers who are supplied from points like Boston and Providence; tide business, especially for the large corporations, has not yet been closed to any extent. Buyers are tempering the situation and in view of the general outlook are likely to be slow coming into the market. Georges Creek is coming down only on orders, and generally there is lack of snap to bituminous in all directions, both all-rail and at tide. Mine prices are down to last year's range for March delivery.

The call for anthracite is spotty. There is an abundance of independent coal being offered at prices well down to the April circular, or 50c. less than the present company figures, but apparently only a small tonnage is being placed. No one wants egg, and the edge is off on the demand for stove and chestnut. Some of the companies, who are equipped with Eastern storage, are sending egg and chestnut to those points and stove coal that only a few weeks ago was next to impossible to get in any but small lots is now being freely offered in straight cargo shipments. Pea is also appearing in increasing quantities, now that the demand is falling off in the large cities.

It is apparent that the distribution business inland is being more and more confined to those agencies that are equipped to make deliveries by the day or by the week. So many of

the mills have relatively small storage, as compared with consumption, that the distributor who is in a position to deliver just so much coal at stated intervals has much the advantage. The old method was to rely on rail or barge tonnage to arrive at times that could only be estimated, but now with large steam colliers seldom varying the time in transit or the number of trips in a season, the conditions are much changed. The larger consumers who have large storage facilities will undoubtedly continue to buy a share, at least, of their fuel requirements through the spring and summer, and usually they save a good deal by being in shape to do that.

Current wholesale quotations are about as follows:

Clearfields, f.o.b. mine.....	\$1.25@	1.40
Clearfields, f.o.b. Philadelphia.....	2.50@	2.65
Clearfields, f.o.b. New York.....	2.80@	3.00
Cambrias, Somersets, f.o.b. mines.....	1.35@	1.60
Cambrias, Somersets, f.o.b. Philadelphia.....	2.60@	2.85
Cambrias, Somersets, f.o.b. New York.....	2.90@	3.15
Pocahontas, New River, f.o.b. Hampton Roads.....	2.60@	2.70
Pocahontas, New River, on cars Boston.....	3.75@	3.90
Pocahontas, New River, on cars Providence.....	3.75@	3.85

NEW YORK

Bituminous—The bituminous market has shown a tendency to ease off still further during the past week and prices are slightly softer. It is reported in one instance that an indifferent grade of Clearfields has been offered down to \$1.05 f.o.b. mine; such cases are, however, more the exception than the rule, and because of the uncertainty in quality, should not be accepted as any accurate criterion of conditions. There are large tonnages on hand at the piers, and rumors state that producers are beginning to curtail production, rather than sell at prevailing low prices.

Little or nothing is being done on next season's contracts, producers and consumers being hopelessly separated on prices. The companies are showing a determined effort to obtain advances over last year's figures of as much as 25c., in exceptional cases. Consumers on the other hand are naturally little interested in these high figures because of the declining spot market and the result is a deadlock. From present indications the buyers will not close contracts until forced to do so, and the ultimate figures will probably be a slight increase, on an average of about 5c. per ton, over last year's figures.

Bituminous prices have experienced a further decline during the week and we quote the nominal local market on both hard and soft coal on the following basis:

	Anthracite		Bituminous
	Circular	Individual	
Broken*.....	\$5.00	4.75	West Virginia, steam.....\$2.60@2.65
Egg.....	5.25	4.70	Fair grades, Penna.... 2.65@2.70
Stove.....	5.25	5.25	Good grade, Penna.... 2.75@2.80
Chestnutf.....	5.50	5.50	Best miller, Penna.... 3.05@3.15
Pea*.....	3.50	3.75	Georges Creek..... 3.25@3.30
Buckwheat**.....	2.75	2.50	
Buckwheatf.....	2.45	2.35	
Rice**.....	2.25	2.25	
Ricef.....	1.95	1.90	
Barley†.....	1.75	1.20	

* Scranton and Lehigh. ** Scranton. † Lehigh and Schuylkill.

Anthracite—Buying of hard coal is now confined entirely to immediate needs. Consumers are keeping requisitions down to the lowest possible minimum to avoid carrying any tonnages over Apr. 1, when the summer discount goes into effect. The orders will naturally be light from now on until summer stocking begins.

Locally few of the companies appear to be finding it necessary to put any coal in storage as yet. They are, however, already beginning to look forward to an early loading of lake vessels, for shipment into the Northwest. As a rule production at the mines is quite heavy, there being few interruptions. Last week there was some shortage of open cars, but not serious. In view of the reduced circular effective Apr. 1, orders will gradually fall off through this month until operators will be forced to curtail the production.

PHILADELPHIA, PENN.

It is commencing to look now as though the anthracite business, for the winter of 1912-13, was about done. All the dealers here claim to have stocks of coal sufficient to carry them over until the spring or opening prices are announced.

and with the cheap coal offered by the individual operators, there is no reason why they should load themselves up with any more coal at the full circular prices, than is necessary. It would take unusual conditions to bring about any particular active demand. Outside of stove and pea, there does not seem to be any call at all, and there is no waiting in line for stove. Pea coal is still a little short of the demand, although the dealers claim to have no difficulty in keeping up with their current business. It is simply a waiting game and any orders placed now are to piece out, until the usual spring reduction becomes effective.

Bituminous coal still continues in the same apathetic condition. While it is understood that contracts are being renewed at better figures than last year, at the same time current business is far from satisfactory. It is understood that there is a large accumulation of loaded cars at tidewater points, and if demurrage on these grows to any extent, there is likely to be some bargain coal on the market.

PITTSBURGH, PENN.

Bituminous—Retail demand is fairly good, while manufacturing continues rather light. It has been between seasons as to contracts, the next period being the year beginning Apr. 1. Against such contracts there has been only moderate inquiry thus far, consumers showing a disposition to hold off until the last moment, on account of the sizable advance in regular circular prices as compared with those of a year ago. Slack for immediate shipment continues to command a slight premium over the regular contract price of 90c., and is quotable at \$1@1.10, while mine-run and screened coal are only moderately firm at regular prices, which we continue to quote as follows: Slack, 90c.; nut and slack, \$1.05; nut, \$1.25; mine-run, \$1.30; ¾-in., \$1.40; 1¼-in., \$1.55, per ton at mine, Pittsburgh district.

Connellsville Coke—The coke market has continued its stiffening, until \$2.50 is the regular asking price for good grades of furnace coke for prompt shipment, and most if not all the operators seem to think they ought to obtain more than this for a contract running to July 1. Curiously enough, there are others, however, who would probably be willing to shade \$2.50 for the second half. Demand for prompt coke is light, and the stiffening in the market appears to be due altogether to the recent sales at cut prices which moved a great deal of coke that had been stocked in the region, 25,000 to 35,000 tons, and that production has been somewhat curtailed owing to lessened activity in the production of off grades, chiefly high sulphur coke, which found a ready market during the famine, but which are practically unsalable now. Foundry coke is relatively stiffer than furnace. We quote: Prompt furnace, \$2.40@2.50; contract furnace (nominal), \$2.50; prompt foundry, \$3.25@3.50; contract foundry, \$3@3.25, per ton at ovens.

BALTIMORE, MD.

A number of independent operators who work a few mines for a brief period during the season, in order to take advantage of the high prices, have closed down completely, because of the depressed condition of the trade. The elimination of these will tend to benefit the market to a certain extent, as it will decrease the supply of spot coal and enable the other operators to obtain a better supply of men. These intermittent operators offer the miners considerably more than the others can afford to pay, and consequently obtain a better supply of men.

Operators feel that their prices on contracts have been too low, and they are making a determined effort to maintain a higher level and believe they will be successful in doing so. It is generally conceded that it is costing more to produce coal than in previous years and that the profit has of late been exceedingly small. Many of the large consumers believe that there is some justice in the stand taken by the trade, for they registered no complaint against the higher contract prices.

Trade conditions during the week did not undergo any change. Unfavorable reports were heard as to the car situation, and on at least one of the roads, operators stated that conditions were worse than they had been for a month. But little spot business came to the surface, and the only activity apparent was in the contract trade. Low-grade coal was quoted from 90c. to \$1 per ton.

There was not much activity at the piers this week; only a few ships loaded here and these were on contract business. Vessel rates for the South were slightly weaker than for weeks previous, owing to the exceptionally favorable weather for sailings. Coke continued strong, the demand for the steel trade holding the market up. Connellsville coke sold around \$3.50 and \$4. Prices for the West Virginia product also remained firm.

BUFFALO, N. Y.

There was again a weather condition that would flatten out the stiffest coal trade. Still the big demand for bituminous has kept prices much firmer than would be expected, so that some of the leading jobbers are reporting prices about on the level of last week. There is also complaint that the car supply has been down to 40 per cent. of requirements. Many roads have been unable to handle the coal after it had started from the mines. They report all embargoes off, but when urged for prompt delivery of coal in transit it is often found that the cars were so scattered about that it was hard to locate them. Still, as this is the chief reason for coal prices staying up, there may not be much reason for complaint.

Though bituminous prices are weak, they are still based on former quotations and with a return of winter conditions, which may occur any day, the prices would stiffen up and hold indefinitely. Pittsburgh select lump sells at \$2.80, three-quarter at \$2.63, mine-run at \$2.55 and slack at \$2.15. Coke hardly holds its own and is not quotable above \$5.35 for best Connellsville foundry. When coke goes very high, and then begins to decline, it takes a long time to stop it.

There is still much hesitation over the making of contracts. Consumers are not offering to close and jobbers and operators claim they could not make anything at present figures. They are not often strong enough to resist, though, even if fairly convinced that prices are too low. The demand for anthracite, is, of course, light. Cancellations of orders, made when there was snow on the ground, are common. Buying will hereafter be from hand to mouth.

The coal trade is much steadier than it has been for some time and it promises to remain so if the weather continues seasonable as it has been so far this month. Uncertainties are now confined entirely to the railroads; every day something new comes up to disturb transportation conditions. Sometimes it is a blockade from accidents down the Allegheny Valley or another embargo on the Canadian roads.

If a big snowstorm should appear prices would return to all their former strength, and for this reason the trade is holding tenaciously to old quotations, as it is much harder to restore them when they are off. This is the time when the good salesman earns his salary and the poor one goes to the wall; for quite a long time there has been little for salesmen to do, but they are out again, as the orders are not coming in unsolicited as freely as they were.

COLUMBUS, OHIO

The warmer weather of the past week had the effect of softening the coal trade in Ohio to a certain extent. But the volume of business is still good and the prospects for the future are believed to be fair at least. Prices have not suffered by the warm spell and there is still a fair demand for domestic.

The steam trade continues good as manufacturing is still prosperous. Contracts are expiring now and arrangements are being made to renew at slightly higher figures. Railroads are also taking a large tonnage as the freight movement continues good. The domestic trade is weakening as dealers are not placing orders with operators and shippers as freely as formerly. Stocks on hand are not large and if there should be a spell of cold weather it will be reflected immediately upon the trade.

In the Hocking Valley and in Pomeroy Bend districts the output has been about 80 per cent. of normal. The same is true of other fields with the exception of eastern Ohio where it has been about 75 per cent. Some trouble was reported from a car shortage in eastern Ohio, but other districts appear to have a sufficient supply of equipment.

Quotations in the Ohio fields are as follows:

	Hocking	Pittsburgh	Pomeroy	Kanawha
Domestic lump.....	\$1.40	.....	\$1.40	\$1.40
¾-in.....	1.30	.....	1.35	1.30
Nut.....	1.30	\$1.20	1.25	1.25
Mine-run.....	1.15	1.05	1.15	1.15
Nut, pea and slack.....	1.00	.....	1.05	1.00
Coarse slack.....	0.90	0.90	0.95	0.90

There is every indication for an active lake business the coming season. The recent cold snap has resulted in the dock stocks being depleted and there is little probability of any coal being carried over. As a result the lake season will be active if sufficient bottoms can be secured; the chances are good for an active ore trade also.

CLEVELAND, OHIO

The Cleveland market shows little, if any, improvement over a week ago. There is an apparent lull in the demand for coal and many consumers have curtailed their shipments to reduce their storage supply.

While the movement to this district has slightly improved, Pennsylvania and Ohio shippers are experiencing great difficulty on coal routed via Toledo. Six hundred cars are delayed, awaiting acceptance by the Detroit & Toledo Shore Line R.R. on account of the congested condition at Toledo. Eastern carriers have placed an embargo restricting the routing of coal via the D. & T. S. L. when destined to points on the Grand Trunk Ry. This has caused no inconsiderable hardship to shippers and they will be forced to discontinue shipments on many large railroad and corporation contracts until the embargo is raised.

Wholesale quotations per short ton, f.o.b. cars at the mines, are as follows:

District.	Freight rate	1-in.lump	Mine-run	Slack
Youghiogheny.....	\$1.00	\$1.40	\$1.30	\$1.10
Pittsburgh No. 8.....	0.90	1.20	1.10	1.10
Goshen No. 6.....	0.70	1.35	1.25	1.20
Coshocton.....	0.70	1.55	1.35	1.20

Pocahontas lump and egg is quoted at \$1.75, run-of-mine \$1.15, and slack \$1, f.o.b. mines. Massillon domestic lump is selling at \$2.50 and Hocking lump at \$1.55, mines. Furnace coke has dropped to \$2.25, f.o.b. ovens; about 75c. is added for the foundry grades.

Shippers of coal from the Youghiogheny belt seem to be highly elated over the recent advance in the price of oil. Many of the large gas plants have been making water gas, but the increase in the price of oil will prohibit, to a large degree, the manufacturing of gas from this product. Many large plants have already changed to coal gas, and this will have a stimulating effect on the Youghiogheny market and high premiums will, undoubtedly be paid on coal from this district. This is regarded as the opportune time for the operator of gas coal to insist on getting a good price for his product. He was handicapped by a scarcity of men and cars and is not getting the returns from his miners that he was when labor was plentiful. Certainly better results should be attained from the great tonnage sent out from this field.

HAMPTON ROADS, VA.

Prices of tidewater coals are still showing a downward tendency, with but small prospects of any increase in the near future. Sales of spot, New River and Pocahontas, have been made during the past week at \$2.60 f.o.b. and even at this low figure, there have been but few transactions; the holders of surplus tonnages shipped on speculation, have found themselves in a difficult position.

Notwithstanding quite heavy dumping at the coal piers, there are still large accumulations of loaded cars, nearly all of the coal shipped having been on contract business to New England ports. The situation is worse at Newport News, where the dumping has been slow. The Sewalls Point piers did a fair week's business, but nothing to what they could have done, had there been a good supply of ships. Movement of coal from the mines continues to be good.

The export business still shows an increase and rumors are heard of some large contracts to begin on Apr. 1. The local market is still quiet and buyers are slow to make contracts during the present downward tendency; however, there has been as yet, no break in the local contract price, \$1.25 per net ton f.o.b. mines.

BIRMINGHAM, ALA.

The volume of the steam business continues to be large with good prospects of unusual prosperity during the next several months. Operators are cheerful over this and also that general business in the South was never as good as it is at present. An immense amount of construction work is under way and there are shortages of labor; neither are there any labor troubles worthy of mention. A slight car shortage is now apparent with two of the larger lines, although, as a rule, all mines have been well supplied with cars since the first of January.

The coke market remains unchanged, although competition with Virginia producers is keen in some districts. The abnormal Virginia coke market during the past several months has enabled the Alabama producers to cover a broader territory and has been a source of strength to the local trade.

LOUISVILLE, KY.

For some unaccountable reason, the steam market has eased up a trifle. Little heating has been required recently, which may be the cause for a slight slackening of the demand. It is possible that the stringency of the market during the past few weeks has resulted in their being forced to curtail operations somewhat, which would have its effect in a considerably lessened demand.

Eastern Kentucky block and lump varies from \$1.60 to \$2 a ton f.o.b. mines, indicating that coal is being sold at about what it will bring; round is selling at the usual differential below these prices. Mine-run fluctuates between \$1 and

\$1.20, and nut and slack is now selling at from 75 to 90c. for the better grades, and as low as 50c. for lower qualities. Some Indiana nut and slack is reported selling at 65c., the advantage in freight rates making this a favorable price for delivery to this market, in the absence of better coal. Western Kentucky nut and slack can be had at about the same price.

The trade here is still clinging to the possibility of seasonable weather in March, as that month not infrequently brings cold weather and blizzards, but as the whole winter has been one of disappointments, operators are prepared to face an early spring, and a consequent steady slackening off of business. Practically all dealers will, however, have to put in pretty fair stocks, as their conservative attitude at this time indicates that they are taking no chance of going into the summer with a large quantity of coal on hand, bought at winter prices.

INDIANAPOLIS, IND.

Continued mild weather makes the consumption of coal unusually light for February. Mine prices, which have been practically at summer schedule, have not improved any and it is reported there have been some bargain sales to retailers. However, those who bought heavily in the fall, in an effort to take care of their customers, when it looked as if the car shortage was going to cause a coal famine, have not reduced prices. Smaller yards that were unable to place large orders in the fall have had opportunity to take advantage of the mild-weather cut at the mines and are offering Indiana lump as low as \$3, Pocahontas lump at \$5.75 and furnace anthracite at \$8.50. The mines are curtailing their running schedules again. On account of the poor demand for domestic, Plymouth Mine, No. 1, of the Coal Bluff Mining Co., in the Brazil field, has been closed down until next fall. Indiana prices, f.o.b. mill, are as follows:

No. 4 mine-run.....	\$1.15	Domestic lump 5- and 6-in.....	\$1.65
Nos. 5 and 6 mine-run.....	1.05	Screenings, No. 4.....	0.80
No. 4 steam lump, 1½-in.....	1.30	Screenings No. 5 and 6.....	0.70
Nut, No. 4.....	1.40	Washed coal, Nos. 1 & 2.....	\$1.75@2.00
Egg.....	1.45	Brazil block.....	2.20
Domestic lump 2½-in.....	1.50		

DETROIT, MICH.

Cars are coming through quite promptly, and it is predicted that the D. & T. Shore Line will embargo against the Grand Trunk, because of its inability to handle freight billed over the Grand Trunk. There are few new orders being taken at present owing to the unusually warm weather. However, a considerable number of delayed shipments are coming in and flooding this market with track coal. Domestic is unusually bad. Dealers all over Detroit and immediate vicinity are loaded up so fully that it is impossible for them to take in any more, and they are asking the mines to discontinue shipments on their contracts.

If the present cold weather continues it will give the operators and dealers a chance to bring business up to the record of the previous year at this time. There have been several large contracts let, although operators seem a little reluctant to close owing to the disturbed conditions which exist in West Virginia.

The car situation shows a marked improvement, and there seems to be little trouble in supplying equipment or moving shipments.

The prevailing market prices for today are as follows:

	W.Va. Splint	Gas	Hock- ing	Cam- bridge	Ohio No. 8	Poca- hontas	Jackson Hill
Domestic lump.....	\$1.40	.....	\$1.80	.....	.....	\$1.60	\$2.00
Egg.....	1.40	.....	1.80	.....	.....	1.60	2.00
Nut.....	1.25	.....	1.25	.....	.....	.....	.....
1-in. lump.....	1.05	\$1.05	1.15	\$1.05	\$1.15	.....	.....
Mine-run.....	0.90	1.00	0.90	1.00	1.00	1.25	.....
Slack.....	1.10	1.15	1.10	1.10	1.10	1.20	1.10

ST. LOUIS, MO.

In the Carterville field, mine-run costs approximately from \$1 to \$1.10 per ton to produce. Screenings are selling at 80@85c.; 40% at 85c. means 34c. for screenings, and 60% at \$1.10 as a maximum, nets 66c., making \$1 per ton for mine-run on a screened basis. These are the minimum producing and the maximum selling prices, so it is easy to see what the situation is. In East Louis there were several hundred cars of coal the past week from the Carterville field, which sold at \$1@1.05. In the Standard field it costs from 85@90c. to produce the coal, and mine-run is selling at 80c., with the screened coal going at anything from 82½@90c., and screenings at from 60@65c.

The market condition in St. Louis has not changed any for the better, although the earlier part of the week the weather indications were such that there was hope for improvement.

It would take a period of from a week to ten days before cold weather could affect any change.

	Carterville and Franklin Co.	Trenton and Big Muddy	Mt. Olive	Standard
2-in. lump.....				\$0.90 @ 0.95
3-in. lump.....			\$1.25	
6-in. lump.....	\$1.25		1.35	1.00 @ 1.10
Lump and egg.....	1.20	\$2.25		
No. 1 nut.....	0.85			0.60 @ 0.65
Screenings.....	1.10			
Mine-run.....	1.35			
No. 1 washed nut.....	1.30			
No. 2 washed nut.....	1.25			
No. 3 washed nut.....	1.20			
No. 4 washed nut.....	1.10			
No. 5 washed nut.....				

CHICAGO

With a return of snow and a drop in temperature, Chicago coal dealers are expecting a revival in prices. For several days the market has been demoralized and prices slashed right and left. Unusual production and an exceptionally large volume of shipments are credited with being the chief causes for this condition. The over-shipment was due to a speculative campaign. It has been possible to buy all kinds of Springfield coal at \$1 and, in some instances, Springfield egg, on shipments direct from the mine, has been offered at 85c. Some Franklin County coal of the lump and egg variety has been for sale in Chicago at \$1 and \$1.05.

There has been a reduction of prices for mine-run and steam lump as a result of the fact that a great deal of domestic lump has been sold for steam-making purposes. Prices for screenings also have softened. Furnace and foundry coke are active. A drop of about 25c. a ton has been noted in the prices for domestic sizes of byproduct coke.

Prevailing prices in Chicago are:

	Springfield	Franklin Co.	Clinton	W. Va.
Domestic lump.....	\$2.07@2.22	\$2.45@2.55	\$2.27	
Egg.....		2.45@2.55		\$3.95
Steam lump.....	1.92@1.97		2.17	
Mine-run.....	1.87@1.92	2.20@2.30	1.97	3.30
Screenings.....	1.57@1.62	1.90@1.95	1.67	

Coke—Connellsville and Wise County, \$6@6.25; byproduct, egg, stove and nut, \$5.50; gas house, \$5.50@5.75.

OGDEN, UTAH

The larger dealers who continue buying during the spring and summer have decreased their orders, and are endeavoring to clean up their yards. This period is the hardest on the operators and probably the dullest time of the year. Later, shipments will adjust themselves to regular summer business, and the mines will be able to work accordingly.

The eastern market is still in bad shape and shipments low; in fact, it has been a number of years since the movement has been so small. Nebraska and Kansas have not been visited by a severe winter and this, in connection with the heavy shipments during January, caused by the railroad routing cars east, has given all dealers a good supply of coal, which must be disposed of before spring.

COAL TRADE NEWS

HAMPTON ROADS, VA.

Lambert Point piers established a new high record during the week ending Feb. 22. Slightly over 150,000 tons were dumped. Between 6 p.m., Sunday, and 6 a.m. Tuesday, the dumping totaled 33,000 tons.

ST. LOUIS, MO.

Local operators are being obliged to close down because of slack business. Those having contracts claim they can buy in the spot market cheaper than they can produce. Hence they are making additional profits by keeping mines idle. Other operations closing down indefinitely has been steadily increasing for several weeks.

BOSTON, MASS.

If water freights from Hampton Roads continue on their present high level there is likely to be a somewhat enlarged market for the better known grades in Pennsylvania. In other words, Pocahontas and New River at \$2.85 will lose tonnage to Cambrias and Clearfields that range in price from \$2.50@2.75 at Philadelphia, for ordinarily anthracite barge transportation can be had from Philadelphia at less than the going rates from the Virginia ports.

CLEVELAND, OHIO

Too much emphasis cannot be given to the great volume of bituminous and anthracite coal, which will be shipped via the Great Lakes during the coming season of navigation. The demand for Youghiogheny coal for lake shipment, continues to hold out and shippers of coal from the gas belt expect to receive high premiums for their product this year. There has been no change in the lake freight rate to Lake Michigan; so far all contracts have been drawn up on the basis of 35c. per net ton. Coal men look for an early opening of navigation; practically all the coal-carrying vessels will be ready for operation by Apr. 10 at the latest.

PRODUCTION AND TRANSPORTATION STATISTICS

NORFOLK & WESTERN RY.

The following is a comparative statement of the coal and coke shipments over the lines of the N. & W. Ry. for the months of December and January of the last two years, in short tons:

Destination	December 1911	December 1912	January 1912	January 1913
Coal				
Tidewater, foreign.....	101,118	84,083	112,204	144,062
Tidewater, coastwise.....	293,850	258,216	248,219	308,918
Domestic.....	1,413,644	1,355,189	1,327,525	1,616,894
Coke				
Tidewater, foreign.....	5,713		4,556	5,055
Domestic.....	116,988	134,763	127,084	143,196
Total.....	1,931,313	1,832,251	1,819,588	2,218,125

SOUTHWESTERN TONNAGE

The following is a comparative statement of the Southwestern production for August and September, 1911 and 1912:

State	1911	1912	Change	1911	1912	Change
Missouri.....	186,852	213,603	+26,751	202,404	242,871	40,467
Kansas.....	400,820	408,947	+8,127	401,536	424,329	22,793
Arkansas.....	139,762	172,090	+32,328	133,238	169,325	36,087
Oklahoma.....	257,773	232,768	-25,005	229,300	249,604	20,304
Totals...	985,207	1,027,408	+42,201	966,478	1,086,129	119,651

THE CAR SITUATION

American Ry. Association reports surpluses and shortages of coal equipment for two weeks ended Feb. 15 as follows:

	Surplus	Shortage	Change
New England Lines	203	250	47
N. Y.; New Jersey, Del.; Maryland; Eastern Penn....	5,214	153	5,061
Ohio; Indiana; Michigan; Western Pennsylvania.....	5,563	65	5,498
West Virginia, Virginia, North & South Carolina....	584	1404	820
Kentucky, Tenn.; Miss.; Alabama, Georgia, Florida..	596	517	79
Iowa, Illinois, Wisconsin, Minn.; North & South Dakota.....	1,337	100	1,231
Montana, Wyoming, Nebraska.....	0	41	41
Kansas, Colorado, Missouri, Arkansas, Oklahoma....	1,068	431	637
Texas, Louisiana, New Mexico.....	416	0	416
Oregon, Idaho, California, Arizona.....	1,417	25	1,392
Canadian Lines.....	0	0	0
Totals.....	16,398	2986	13,412

FOREIGN MARKETS

GREAT BRITAIN

Feb. 14—The market rules quiet. The shortage of ready steamers, caused by this week's dense fog, has depressed conditions for prompt loading. For forward loading sellers are holding for higher figures, and there is a disposition to fix requirements for next month. Smalls remain stationary. Quotations are approximately as follows:

Best Welsh steam.....	\$4.38@4.44	Best Monmouthshires..	\$4.08@4.14
Best seconds.....	4.20@4.32	Seconds.....	3.96@4.02
Seconds.....	4.14@4.20	Best Cardiff smalls....	3.54@3.60
Best dry coals.....	4.38	Seconds.....	3.24@3.36

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport; both exclusive of wharfage, and for cash in 30 days—less 2½%.

FINANCIAL DEPARTMENT

Colorado Fuel & Iron Co.

Under date of Oct. 21, President J. F. Welborn issues his report for the fiscal year ended June 30, 1912, from which the following abstract is taken:

Results—Gross earnings from operation were \$24,268,452, an increase of \$1,333,767, or 6%. Operating expenses absorbed \$1,039,835, leaving \$23,228,617 net gain, and making total net from operations \$3,772,282, an increase of 8.4%. Adding income from other sources, the net income was \$4,448,975. After providing for all fixed charges, sinking funds, etc., there remained a surplus of \$1,801,229, out of which a dividend of 5% (\$100,000) was declared on the pref. stock, leaving \$1,701,229 for profit and loss.

There was a decrease of 195,000 tons in coal output. This is accounted for by a falling off in railroad consumption of somewhat more than that tonnage and an increase in general sales. The result in fuel department earnings was a decrease of \$31,092 in gross and an increase of \$29,724 in net; as prices of domestic coal were generally lower than in previous years and an advance in miners' wages made effective April, 1912, added at least \$20,000 per month to producing cost for three months of the year, this showing is considered particularly favorable.

Charter Renewal—At the stockholders' meeting, Oct. 19, 1912, the charter was renewed for 20 years from Oct. 21, 1912.

STATEMENT OF PRODUCTION FOR YEARS ENDING JUNE 30

Short tons—	1911-12	1910-11	1909-10	1908-09
Coal.....	4,038,852	4,233,756	4,722,832	4,094,352
Coke.....	777,993	753,192	905,599	645,545
Iron ore.....	813,728	841,609	879,630	580,784
Limestone.....	459,913	425,704	407,517	363,975
Pig iron produced.....	426,659	397,701	385,602	295,534
Finished iron and steel.....	485,743	424,421	412,749	359,793

RESULTS FOR YEAR ENDING JUNE 30

Gross Earnings—	1911-12	1910-11	1909-10	1908-09
Iron department.....	\$15,140,523	\$13,775,564	\$13,604,832	\$12,058,228
Industrial dept. (fuel).....	9,127,920	9,159,021	10,034,981	7,889,910
Denver retail dept.....				396,492
Total gross earnings.....	\$24,268,452	\$22,934,685	\$23,639,813	\$20,344,631
Net Earnings—				
Iron department.....	\$2,766,775	\$2,502,566	\$2,492,136	\$1,997,384
Industrial dept. (fuel).....	1,005,507	975,783	1,250,479	903,627
Total net earnings.....	\$3,772,282	\$3,478,349	\$3,742,615	\$2,901,011
Add—Income from securities.....	526,270	535,672	499,080	328,341
Interest and exchange.....	150,423	135,927	127,840	117,420
Total net income.....	\$4,448,975	\$4,149,948	\$4,369,535	\$3,346,772
Deduct—				
Bond interest.....	\$2,039,622	\$2,091,610	\$2,097,692	\$1,054,968
Taxes.....	226,737	214,785	218,765	177,783
Real estate.....	138,317	151,263	171,458	61,414
Insurance, sociological, personal injury, etc.,	64,105	233,602	154,908	52,346
Equipment renewal.....	120,000	128,106	164,945	
Loss on Col. & Wyo. Ry.		610,005		194,691
Loss on Crystal R. R.R.	36,000	36,000	36,000	632,575
Rentals (Col. Ind. Co. prop.).....				896,461
Prospecting.....	22,965	24,904	18,948	18,158
Prof. dividends (5%).....	100,000			
Total deductions.....	\$2,747,746	\$2,893,276	\$2,862,716	\$2,488,396
Balance, surplus.....	\$1,701,229	\$1,259,672	\$1,506,819	\$858,376

b Includes traffic contract guaranty at \$25,000 per month (\$300,000), less earned from traffic, as per contract for year, \$289,995 in 1911-12 and \$105,309 in 1908-09.

c Includes traffic guaranty at \$3000 per month (\$36,000), less earned from traffic as per contract for year, \$3425.

BALANCE SHEET JUNE 30

Assets—	1912	1911
Properties and securities.....	15,749,791	15,742,701
Equipment.....	27,062,157	27,078,135
Cash on hand.....	4,543,007	3,590,120
Stocks and bonds.....	7,381,644	6,215,220
Accounts and bills receivable.....	3,914,562	3,306,639
Subsidiary cos.....	2,415,811	2,586,331
Manufactured stocks, etc.....	2,682,515	3,175,304
Stripping, etc.....	193,609	328,785
Accrued dividends and interest.....	88,989	78,576
Miscellaneous.....	145,275	152,195
Total.....	64,177,360	62,254,006

Liabilities—

Common stock.....	34,235,500	34,235,500
Preferred stock.....	2,000,000	2,000,000
Funded debt.....	20,813,000	20,816,000
Accounts and bills payable.....	950,600	889,245
Hospital.....	14,616	8,558
Accrued bond int.....	834,633	857,515
Tax payment fund.....	100,000	100,000
Preferred dividends.....	100,000	
Sinking fund—real estate.....	985,116	932,124
Miscellaneous funds.....	239,734	177,912
Profit and loss.....	3,904,161	2,237,152
Total.....	64,177,360	62,254,006

z Includes Col. Fuel & Iron Co. 5% 10-year convertible gold debts., \$14,067,000; Col. Fuel & Iron Co. 5% general mortgage bonds, \$5,598,000; Colorado Fuel Co. 6% general mortgage bonds, \$280,000; Grand River Coal & Coke Co. 6% first mortgage bonds, \$868,000.

The Lehigh Valley Coal Sales Co.

The Lehigh Valley Coal Sales Co. was incorporated under the date of January 22, 1912, for the purpose of shipping and selling the coal mined and purchased by the parent company. The authorized capital stock of the Sales Co. is \$10,000,000, of which \$6,060,800, or 121,216 shares, with a par value of \$50 each, were full subscribed to and issued. The stockholders of the Lehigh Valley R.R. Co. were given the privilege of subscribing at par to an amount equivalent to 10% of their holdings. After the organization of the company was completed, a contract was executed, effective March 1, 1912, between the parent company and the Sales Co., under the terms of which the latter is now purchasing at the breakers and shipping the coal mined and purchased by the parent company.

COAL SECURITIES

The following table gives the range of various active coal securities and dividends paid during the week ending Feb. 22:

Stocks	Week's Range			Year's Range	
	High	Low	Last	High	Low
American Coal Products.....			94	94	94
American Coal Products Pref.....			109½	109½	109½
Colorado Fuel & Iron.....	36	33½	34	41½	31
Colorado Fuel & Iron Pref.....			155	155	150
Consolidation Coal of Maryland.....	102½	102½	102½	102½	102½
Island Creek Coal Pref.....	86	85	85		
Lehigh Valley Coal Sales.....	240	204	204		
Pittsburgh Coal.....	21	20	20½	24½	20
Pittsburgh Coal Pref.....	87	84½	85½	95	84½
Pond Creek.....	26	24	25	28½	24
Reading.....	160½	157½	157½	168½	157½
Reading 1st Pref.....	90½	90	90	91½	90
Reading 2nd Pref.....	90	89	89	93	89½
Virginia Iron, Coal & Coke.....	50½	49	49	54	49
Bonds	Closing Bid	Asked	Week's Range or Last Sale	Year's Range	
Colo. F. & I. gen. s.f.g. 5s.....	99	100	99	98	99½
Colo. F. & I. gen. 6s.....			107½	June '12	
Col. Ind. 1st & coll. 5s. gu.....	82½	Sale	82½	84	85
Cons. Ind. Coal Me. 1s 5s.....			85	June '11	
Cons. Coal 1st and ref. 5s.....			92	93	Oct. '12
Gr. Riv. Coal & C. 1st g 6s.....	96		102½	Apr. '06	
K. & H. C. & C. 1st s f g 5s.....			98	Jan. '13	98
Pocah. Con. Coll. 1st s f 5s.....	87½	88	87½	Feb. '13	87½
St. L. Rky. Mt. & Pac. 1st 5s.....	76½	77½	76½	Feb. '13	76
Tenn. Coal gen. 5s.....	101½	102	102½	102½	103
Birm. Div. 1st consol. 6s.....	101½	103½	102½	Feb. '13	102½
Tenn. Div. 1st g 6s.....	101½	103½	101½	Dec. '12	
Cah. C. M. Co. 1st g 6s.....			110	Jan. '09	
Utah Fuel 1st g 5s.....			79½	79½	79½
Victor Fuel 1st s f 5s.....			79½	79½	79½
Va. I. Coal & Coke 1st g 5s.....	97½	Sale	97½	96½	98

Delaware & Hudson Co.—Regular quarterly of 2¼% payable Mar. 20, to holders of record Feb. 25.

Reading Co.—Regular quarterly on 2d preferred of 1%, payable Apr. 10 to holders of record Mar. 25.

Burns Bros.—Coal sales of this company increased from 50,000 tons in 1885 to 1,950,000 tons in 1912; the average sales over the last five years were 1,800,000 tons. The company has paid interest on its bonds regularly, redeemed \$500,000 of a total of \$1,000,000, 5% bonds, and distributed \$1,605,000 in dividends on its \$1,500,000 common stock.